Engin
Library

NOV 3 1940

American Foundryman

A PUBLICATION [illegible] TIVITIES

November
1940

The Non-Ferrous Industry Meets New Conditions

THE NON-FERROUS INDUSTRY in general and the foundry in particular are entering a period of "Specification Consciousness." This is in part due to the National Defense program and also to the general design developments which are tending to encroach upon maximum physical properties. Striving to operate successfully under these new conditions can result in nothing other than progress and the all round good of the industry.

Work of the critical nature now being undertaken calls for an alertness on the part of the foundryman somewhat more pronounced than heretofore. The industry generally is reviewing its entire practice with a sharp eye to make certain of economic, productive operation under these new conditions. Many of the presently active non-ferrous materials are those with which we are only generally familiar whereas their successful handling requires specific knowledge. In order that these problems may be met with the least difficulty, the foundryman must avail himself of all the information existing in the field.

The non-ferrous branch of the metal industry is receiving and will evidently continue to receive an increasingly generous share of the present surge in business. The magnitude of the responsibility which is falling into our hands is such that it is of vital importance that we equip ourselves with every possible means of meeting the challenge. One of the proved methods of maintaining contact and keeping abreast of developments in the industry is an active participation in the American Foundrymen's Association. The activities of its personnel cover the whole scope of the industry. They are dedicated to the furtherance of their own and the common good. Being a part of this body of competent foundry people is definitely a matter of good business.

William J. Laird

WILLIAM J. LAIRD, General Chairman
A.F.A. Non-Ferrous Division

William J. Laird, who for several years has served on the A.F.A. Non-Ferrous Division Committee, is metallurgist, Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Before accepting this post with his present company he was employed by the United States Steel Corp., Pittsburgh, Pa., also as a metallurgist. Mr. Laird has been an active member in the non-ferrous field and has played an important part in the development of the non-ferrous division of the association. In 1938 he was elected to serve two years as vice-chairman of the Non-Ferrous Division. He completed his term of office in 1940 and was immediately elected general chairman to succeed Harold J. Roast. Along with his non-ferrous activities Mr. Laird also serves the association as a member of the Divisional Activities Correlation Committee.

A. F. A. Officers

President
L. N. SHANNON*
Stockham Pipe Fittings Co.,
Birmingham, Ala.

Vice President
H. S. SIMPSON*
National Engineering Co., Chicago, Ill.

♠

Board of Directors

Term Expires 1941

H. BORNSTEIN*
Deere & Co., Moline, Ill.

W. H. DOERFNER*
Saginaw Malleable Iron Div.
General Motors Corp., Saginaw, Mich.

H. S. HERSEY
The C. O. Bartlett & Snow Co.,
Cleveland, Ohio

G. A. SEYLER
The Lunkenheimer Co., Cincinnati, Ohio

A. WALCHER
American Steel Foundries, Chicago, Ill.

Term Expires 1942

W. B. COLEMAN
W. B. Coleman Co., Philadelphia, Pa.

C. R. CULLING
Carondelet Foundry Co., St. Louis, Mo.

O. A. PFAFF
American Foundry Equipment Co.,
Mishawaka, Ind.

MARSHALL POST
Birdsboro Steel Foundry & Machine Co.,
Birdsboro, Pa.

F. J. WALLIS
International Nickel Co., Detroit, Mich.

Term Expires 1943

G. W. CANNON
Campbell Wyant & Cannon Foundry Co.,
Muskegon, Mich.

B. D. CLAFFEY*
General Malleable Corp., Waukesha, Wis.

HAROLD J. ROAST
Canadian Bronze Co. Ltd., Montreal, P. Q.

L. P. ROBINSON
Werner G. Smith Co., Cleveland, Ohio

H. S. WASHBURN*
Plainville Casting Co., Plainville, Conn.

♠

Staff

Executive Vice President and Treasurer
C. E. HOYT*†

Secretary
R. E. KENNEDY†

Assistant Secretary
N. F. HINDLE†

Director of Safety and Hygiene Section
E. O. JONES†

Assistant Treasurer
J. REININGA†

♠

†Headquarters
Room 1398, 222 West Adams St., Chicago, Ill.

*Members, Executive Committee.

American Foundryman

CONTENTS

November, 1940

Volume 2 **Number 11**

	Page
The Non-Ferrous Industry Meets New Conditions, *by William J. Laird*	Inside Front Cover
Ladle Additions of Graphite to Gray Cast Iron, *by A. H. Dierker*	2
Sub-committee to Study Effects of Sand on Castings' Properties	5
Apprentice Molding and Patternmaking Contests Set for 1941	6
New Chapter Chairmen	7
Development of Some Gating and Feeding Methods for High Duty Alloys—II, *by A. E. Cartwright and C. C. Brisbois*	8
New Members	11
Chapter Activities	12
Announcement to Authors of Papers for 1941 Convention	19
A.S.T.M. Standards	20
Book Reviews	21
Abstracts of Current Foundry Literature	23
November Chapter Schedule	25

Published by the American Foundrymen's Association, Inc., 222 West Adams St., Chicago, Ill., for the purpose of presenting Association and Chapter activities. Published monthly. Subscription price $1.00 per year. Single copies, 10c.

Entered as second class matter July 22, 1938, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

Ladle Additions of Graphite to Gray Cast Iron

By A. H. Dierker, Columbus, O.

This paper was presented before the gray iron session, May 9, 1940, during the 44th annual American Foundrymen's Association convention, Chicago, Ill. The author, Research Engineer, Engineering Experiment Station, Ohio State University, gives data compiled from the experiments made on cupola and electric furnace irons that were conducted at the school's laboratories. He relates the effect ladle additions of graphite has on the mechanical properties and chemical compositions of the standard A.S.T.M. test bars investigated. The study of the microstructure of the test bars revealed a noticeable and consistent difference in one respect. The specimens made from iron to which graphite was added showed a finer grain size than those poured without addition.

THE addition of any type of material to the molten metal, whether in the runner, in the forehearth, or in the ladle, will, for the purpose of this discussion, all be classified as ladle additions. In considering such additions, it would seem advisable to think of them as corrective agents rather than as part of the cupola operation. There would appear to be little advantage in going to the trouble and expense of making a ladle addition merely to secure certain properties in the iron when the same properties can be obtained by some small adjustment in the cupola practice.

Nevertheless, there are times when convenience, necessity, or cost would indicate the advisability of some type of ladle addition and it is for such occasions that the following data on graphite, as one agent widely used for the purpose, is presented.

No attempt will be made to discuss the production and properties of the graphite used for this purpose, nor will the commercial use of the material in foundries be discussed. This paper will be confined to the results of laboratory experiments on cupola and electric furnace irons.

Graphite, commercially available, is of two general types: artificial and natural, and can be obtained in a number of different mesh sizes. Both types in different mesh sizes were used in these investigations.

Much of the data to be presented has been previously published in a highly condensed form.[1] The results are being presented here in greater detail, with the addition of data not previously published. The material presented here is with the hope that it will be sufficient to act as a basis for a further study on this subject.

Graphite a Chill Reducer

Graphite, as a ladle addition, is used primarily as a chill reducer and experience to date would indicate that it is most effective in this respect. Where graphite is used as an addition to reduce chill, it is important to know what effect, if any, it might have on the mechanical properties. This investigation was directed largely in that direction.

Three melts were run in a small cupola of the Industrial Engineering Laboratories, Ohio State University. This cupola is lined to 22-in. inside diameter. The same metallic charge was used for each run. Variations in total carbon between the different runs was secured by variations in cupola operation. The charge was as follows:

Material	Per Cent	Weight, lb.
Steel Scrap	40	120
Cast Scrap	38	114
Pig Iron	22	66

The analysis of these materials is given in Table 1. Cupola operations for the three runs are listed in Table 2.

Melting Procedure

The procedure followed in each run was as follows: The blast was put on and melting proceeded until a small amount of metal had accumulated in the crucible of the cupola. Approximately 100 lbs. of metal was then tapped out and discarded. Melting proceeded until the slag began to run into the tuyeres. One thousand lb. of metal was then tapped into an insulated and covered ladle which had been well preheated. Hand shanks, filled from the large ladle, were used in pouring the test castings.

Graphite additions were made as the hand shanks were being filled. Each shank held approximately 40 lb. of metal, and 20 grams of graphite was added in each case; hence, the amount

Table 1

ANALYSIS OF RAW MATERIALS IN CUPOLA CHARGE

	Carbon %	Si. %	Mn. %	P. %	S. %
Steel Scrap	0.84	0.18	0.54	0.02	0.03
Cast Iron Scrap	3.61	1.91	0.45	0.55	0.08
Pig Iron (Silvery)	2.32	7.08	1.06	0.14	0.02

Table 2

DATA ON CUPOLA OPERATION FOR EACH OF THREE RUNS

	Melt No. 8	9	10
Type of coke	By-Product	70% By-Product 30% Pitch	By-Product
Height of coke bed above tuyeres	46-in.	46-in.	54-in.
Coke between charges	35 lb.	35 lb.	35 lb.
Type of flux	1-in. limestone	1-in. limestone	1-in. limestone
Amount of flux on each charge	8 lb.	8 lb.	8 lb.
Size metallic charge	300 lb.	300 lb.	300 lb.
Number of charges	4	4	4
Blast volume	900 cfm	900 cfm	1 000 cfm

[1] Dierker, A. H., Schneider, R. P., and Dawson, H. H., *"The Influence of Graphite Ladle Additions on the Mechanical Properties of Gray Cast Iron,"* ENGINEERING EXPERIMENT STATION REPORTS, Ohio State University, July, 1939.

Table 3

EFFECT OF GRAPHITE ADDITIONS ON MECHANICAL PROPERTIES AND CHEMICAL ANALYSES OF TRANSVERSE TEST BARS

Ladle No.	Ladle Additions	Chemical Analysis T.C. %	Si. %	Mn. %	P. %	S. %	1.2 in. Diameter Bar: Transverse Strength, lb.	Deflection, In.	Brinell Hardness No.	Tensile Strength, lb./sq. in.	Chill Depth	0.875 in. Diameter Bar: Transverse Strength, lb.	Deflection, In.	Brinell Hardness No.	Tensile Strength, lb./sq. in.	2.0 in. Diameter Bar: Transverse Strength, lb.	Deflection, In.	Brinell Hardness No.	Tensile Strength, lb./sq. in.	Pouring Temp °F
8–1	None	3.01	1.91	0.37	0.231	0.116	2845	0.300	229	42000										
2	8-14 A. Gr.	3.23					3260	0.362	217	44900	0.078	1955	0.204	235	49400					
3	14-35 A. Gr.	3.23					3045	0.366	217	43200	0.160	1875	0.183	241	48700					
4	—35 A. Gr.	3.15					3130	0.372	217	41800	0.103	1855	0.200	235	47300					
5	#8 N. Gr.	3.15					3150	0.389	223	42000	0.172	1945	0.185	241	48600					
6	Fine N. Gr.	3.14					3075	0.342	217	43300	0.128	1835	0.172	235	47800					
7	None	3.01					3065	0.344	217	45000	0.233									
8	Fine N. Gr.	3.07									0.193					10400	0.410	197	37900	
9	#8 N. Gr.	3.08									0.189					9850	0.375	197	37850	
10	—35 A. Gr.	3.13									0.132					10670	0.443	197	40200	
11	14-35 A. Gr.	3.13									0.115					10870	0.436	197	40450	
12	8-14 A. Gr.	3.08									0.100					10400	0.447	197	40400	
13	None						2995	0.332	217	43400	0.205					10700	0.419	197	37500	
9–1	None	3.40	2.19	0.44	0.234	0.104	2223	0.293	197	30600	0.180									
2	8-14 A. Gr.	3.46					2260	0.330	187	30000	0.055	1575	0.197	197	34000					
3	14-35 A. Gr.	3.43					2220	0.328	187	28100	0.124	1575	0.196	197	34300					
4	—35 A. Gr.	3.48					2105	0.328	179	28500	0.075	1490	0.188	192	33650					
5	#8 N. Gr.	3.39					2140	0.307	179	27850		1490	0.180	197	34400					
6	Fine N. Gr.	3.42					2230	0.317	179	27850		1530	0.194	187	31700					
7	None	3.40					2270	0.298	187	30050	0.121	1500	0.185	201	34500	7320	0.375	137	22350	
8	Fine N. Gr.	3.40									0.142					7100	0.367	143	22850	
9	#8 N. Gr.	3.38														6560	0.362	137	22700	
10	—35 A. Gr.	3.39									0.069					6500	0.359	131	22000	
11	14-35 A. Gr.	3.43									0.091					6940	0.400	134	22100	
12	8-14 A. Gr.	3.48									0.043					6790	0.389	131	22300	
13	None	3.40									0.113					7000	0.370	131	22050	
10–1	None	3.11	2.37	0.45	0.254	0.120	2960	0.359	217	40850	0.125									2610
2	8–14 A. Gr.	3.21					2995	0.358	207	40600	0.059	1925	0.212	217	44500					2570
3	14-35 A. Gr.	3.22					2820	0.347	217	40200	0.043	1860	0.213	229	44100					2640
4	—35 A. Gr.	3.29					2870	0.389	207	38600	0.040	1915	0.217	217	43750					2580
5	#8 N. Gr.	3.16					2885	0.339	217	41200	0.044	1915	0.205	223	45450					2665
6	Fine N. Gr.	3.11					2800	0.341	217	40400	0.105	1915	0.209	223	44450					2685
7	None	3.11					3045	0.382	217	40250		1975	0.218	217	43450	9470	0.387	179	32100	2610
8	Fine N. Gr.	3.10														9500	0.409	179	32900	2575
9	#8 N. Gr.	3.15									0.082					9580	0.421	170	31850	2550
10	—35 A. Gr.	3.19									0.090					8950	0.502	170	32000	2525
11	14-35 A. Gr.	3.13									0.053					9180	0.428	163	32700	2575
12	8–14 A. Gr.	3.09									0.062					9580	0.431	170	31900	2570
13	None	3.13					2715	0.322	212	40200	0.128					9350	0.440	170	32750	2525

(Note: A. Gr. means artificial graphite. N. Gr. means natural graphite.)

added was approximately 0.11 per cent. The graphite added was of two different types, artificial and natural. The natural graphite added was of two grades, a rather coarse material known as No. 8 Mexican, and widely used for this purpose, and a fine powdery material. The artificial graphite was of three grain sizes, through 8 and on 14 mesh, through 14 and on 35 mesh, and through 35 mesh.

Thirteen ladles of iron were poured from each run, two with each type of graphite addition and three with no additions. The three standard A.S.T.M. transverse bars were poured as test specimens. These bars were poured horizontally. Tensile specimens were machined from broken halves of the transverse bars.

The chill test was a type widely used in automotive foundries. Details of the specimen and methods of casting are shown in Fig. 1. With iron of the general composition used in these experiments, this type of test gives a fairly sharp line of demarcation between the chilled and unchilled portion of the iron. It is not difficult to measure the depth of chill with reasonable accuracy.

Tapping and pouring were done as quickly as possible to secure a minimum temperature drop in the metal during the pouring operation. For this reason, it was rather difficult to

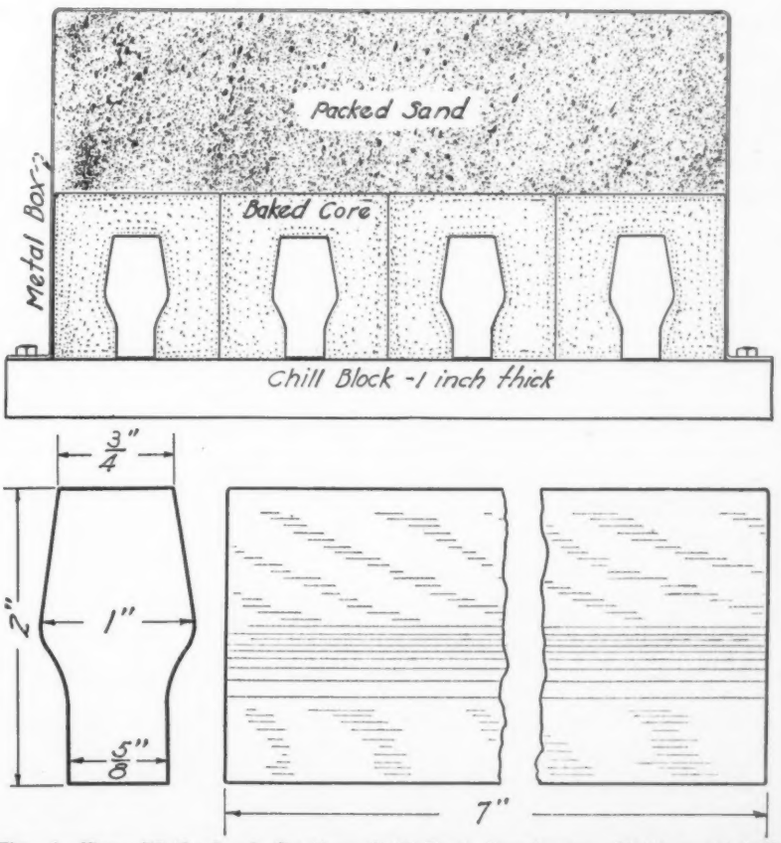


Fig. 1—Top—Method of Casting Chill-Test Specimens. Bottom—Details of Chill-Test Specimen.

get accurate temperature readings with the optical pyrometer. However, the readings taken indicated a temperature drop of less than 100°F. between the first and last casting period.

Table 3 gives in detail the results of the mechanical and chill tests and chemical analysis. In Table 4, these results have been summarized. In Table 3, pouring temperatures are given for melt No. 10 only. Readings were taken on all three melts, but only in the case of No. 10 is it felt that they are sufficiently accurate to publish.

The analysis for total carbon would indicate that the recovery is good and that better recovery is secured at higher metal temperatures. The tests are probably too few to draw any other or more definite conclusions in this respect.

Graphite Type and Size

Although the author was interested in determining the best type and size of graphite to use for this purpose, he feels that the tests to date have not been carried far enough for any definite conclusions along this line. He does feel justified in saying that the very fine mesh sizes, as well as the very coarse particles, are unsatisfactory as ladle additions. In both cases recovery is poor and the results undependable. It also has been observed that the very fine mesh size has a tendency to cause porosity in the metal. It is indicated that the graphite should not be coarser than 8 mesh nor finer than 48 mesh.

Table 3 gives a rather confusing picture of the effect of the graphite additions on mechanical properties. However, the averages, given in Table 4, would indicate that the mechanical properties are not affected materially one way or the other. However, Table 3 does show the danger of drawing conclusions from a few isolated tests. From this table, by choosing the proper data, one could prove that graphite ladle additions have a marked effect in improving the mechanical properties. At the same time, by choosing other figures from the same table, one could prove the exact opposite.

One of the most significant facts brought out by this particular series of tests is the marked change in the properties of the iron that can be secured by a change in cupola operation. All of these operations were with identical metallic charges, and were of a type paralleling com-

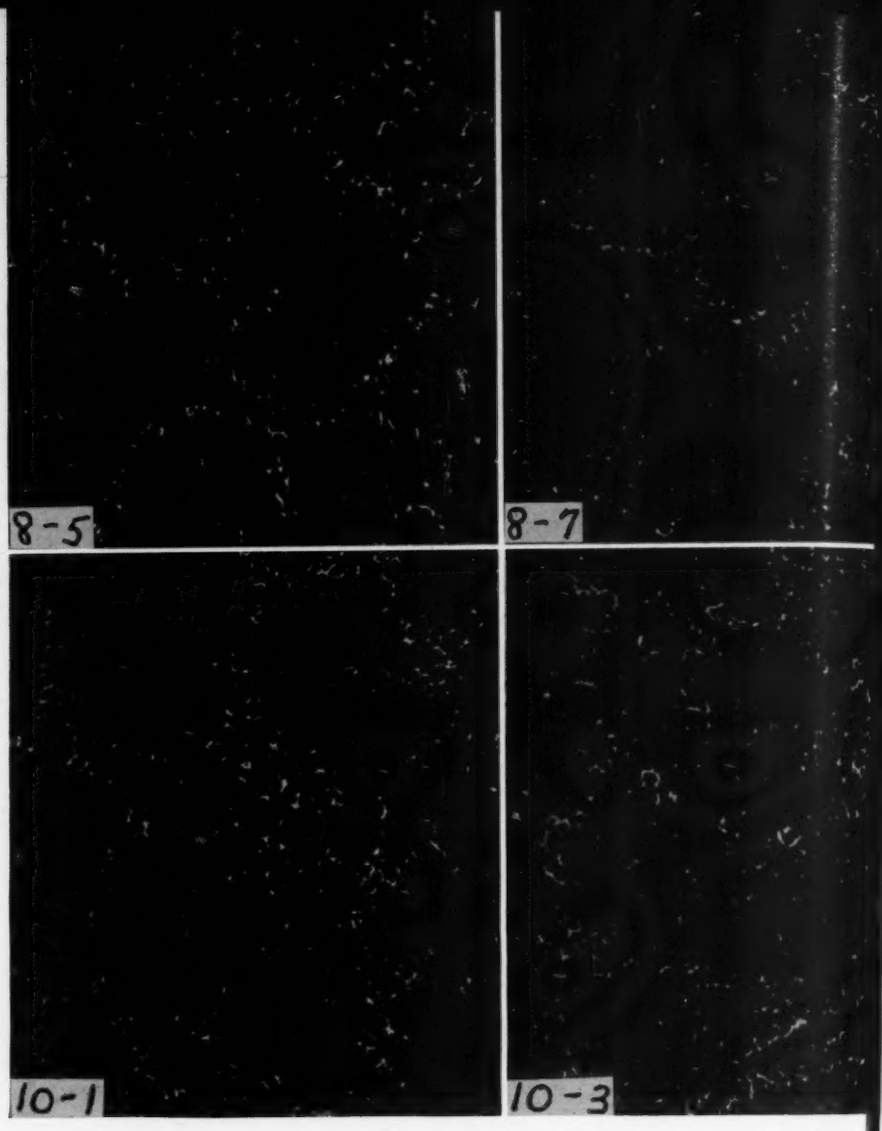


Fig. 2—Showing Comparisons of Gain Size With and Without Graphite Additions. Graphite Added to Specimens 8-5 and 10-3, None Added to 8-7 and 10-1. Etched With Nital x37.

Table 4

AVERAGE MECHANICAL PROPERTIES OF BARS TESTED

	Ladle Additions					
	Melt No. 8		Melt No. 9		Melt No. 10	
	None	Graphite	None	Graphite	None	Graphite
Chemical Analysis						
TC	3.05	3.14	3.40	3.43	3.10	3.17
Si	1.91	.....	2.19	.....	2.37	.....
Mn	0.37	.....	0.44	.....	0.45	.....
P	0.231	.....	0.234	.....	0.254	.....
S	0.116	.....	0.104	.....	0.120	.....
Chill Depth (in.)	0.219	0.136	0.138	0.086	0.126	0.064
0.875-in. Diameter Bar						
Transverse Strength (lb.)	.....	1893	1500	1532	1975	1906
Deflection (in.)	.....	0.189	0.185	0.191	0.218	0.211
Tensile Strength (lb. per sq. in.)	.....	48320	34500	33610	43450	44450
Brinell Hardness Number	.....	237	201	194	217	222
1.2-in. Diameter Bar						
Transverse Strength (lb.)	2965	3132	2246	2191	3002	2874
Deflection (in.)	0.325	0.366	0.295	0.322	0.370	0.355
Tensile Strength (lb. per sq. in.)	43460	42980	30320	28420	40550	40200
Brinell Hardness Number	221	218	192	182	217	213
2.0-in. Diameter Bar						
Transverse Strength (lb.)	10700	10440	7160	6780	9405	9360
Deflection (in.)	0.419	0.422	0.372	0.375	0.413	0.438
Tensile Strength (lb. per sq. in.)	37500	39360	22390	22200	32420	32270
Brinell Hardness Number	197	197	134	135	174	170

Table 5

TEST RESULTS OF ELECTRIC FURNACE IRON
GRAPHITE ADDED TO LADLE

No.	Chemical Analysis T.C., %	Si., %	Mn., %	P., %	S., %	Cr., %	Chill Depth, in.	Transverse 1.2-in. Break, lb.	Def., in.	Brinell Hardness Number	Tensile Strength lb. per sq. in.		
272-6	3.24	1.94	0.61	0.30	0.06	0.09	0.28			*212	*41700	None	
272-3							0.09			*197	*37500	0.15% N.G.	28-48 mesh
276-3	2.99	2.22	0.43	0.17	0.05	0.65	0.50	2860	0.220	235	48200	None	
276-1	3.09						0.32	3270	0.285	241	47660	0.11% N.G.	28-48 mesh
280-4	3.10	2.44	0.47	0.14	0.11	0.63	0.38	3410	0.230	235	52100	None	
280-3	3.16						0.25	3540	0.341	235	52400	0.15% N.G.	14-28 mesh

*From bar 1.25-in.x1.25-inx18-in.

mercial practices, yet the tensile strength of the 1.2-in. diameter bars show a variation of better than 30 per cent with other properties varying accordingly.

Table 5 gives the results of tests of electric furnace iron to which ladle additions of graphite were made. It is interesting to note that, although the tensile strength is about the same, the graphite addition has increased the transverse strength as well as the total deflection. It is thought that the graphite additions would have more effect on harder irons of this type than on the type of iron that has been discussed.

Microstructure

In studying the microstructure of the different test bars made in this investigation, a noticeable and consistent difference was found in only one respect. The specimens made from iron to which graphite additions had been made, show a finer grain size than those poured without any addition. This can be readily seen by studying the micrographs in Fig. 2.

Association Committees

THE work of any technical society must, of necessity, be done largely by members willing to contribute freely of their time and experience. The A.F.A. has been truly fortunate in this respect, for, over the years of its existence, a large number of those wishing to see the foundry industry progress in keeping up with and ahead of the competition from other methods and materials have worked untiringly in preparing papers, committee reports and publications, until today the library of technical publications published by the Association is recognized by the world authorities as the principal source of data on castings developments and processes. The results can be seen in the many references in the foundry literature to the papers and reports appearing in the Transactions of the Association, its Cast Metals Handbook, Sand Testing Standards and Codes of Good Practice on Safety and Hygiene.

That the Association, during the immediate future, will most certainly keep up its good will is indicated by the list of members who have accepted appointments by President Shannon on committees for 1940-41.

Anyone whose name does not appear and who wants to serve on a committee is requested to send his name to the Association office, indicating the committee or activity in which he is most interested.

In discussing committee service and opportunities, Dr. H. W. Gillett, world famous metallurgist, said: "A more effective way is to seek out a committee—asking only to help and learn. The committee meetings would become open to him and the more intimate contacts thus made are of the type that is most useful."

Sub-committee to Study Effects of Sand on Castings' Properties

AT a meeting of the Executive Committee, Foundry Sand Research Committee, during the past Chicago Convention, the organization of a subcommittee to study the effect of sand on the properties of castings was authorized. The action was prompted by the interest shown in two papers presented at the past convention entitled, "Influence of the Mold on Shrinkage in Ferrous Castings," by H. L. Womochel and C. C. Sigerfoos, Michigan State College, East Lansing, Mich., and "Sand Affects Physical Properties of Gray Iron," by H. W. Dietert and E. E. Woodliff, Harry W. Dietert Co., Detroit.

As a result of this authorization, the following committee has been appointed:

Chairman—H. L. Womochel, Research Assistant, Engineering Experiment Station, Michigan State College, East Lansing, Mich.

M. H. Gould, Aluminum Co. of America, Cleveland, O. (Non-Ferrous)

R. E. Morey, Naval Research Laboratory, Washington, D. C. (Steel)

H. W. Dietert, Harry W. Dietert Co., Detroit, Mich. (Gray Iron)

Another member of the committee will be appointed soon to represent the malleable division of the industry.

Members of the Association who have any information or data on any relationship that may exist between the properties of the sand used, and those castings produced, are requested to communicate the same to either the chairman of the committee or the Assistant Secretary of the Association.

Some of the castings made for the 1940 apprentice molding contest showing gates and risers.

(Photo courtesy G. H. Zabel, foundry instructor, Waukesha Vocational School, Waukesha, Wis.)

Apprentice Molding and Pattern-making Contests Set for 1941

THE Apprentice Training Committee announces that competitions will be held for the 1941 convention in gray iron molding, steel molding, nonferrous molding and pattern-making. First, second and third prizes of $30.00, $20.00 and $10.00 respectively will be awarded to winners of each of the four classes in the national contest.

Any regular indentured apprentice is eligible to compete. As in the past, local contests to select entries for the national competition may be conducted by either individual companies or groups. Any one desiring copies of the regulations governing these contests may receive them on application to the Secretary, Apprentice Training Committee, American Foundrymen's Association, 222 W. Adams St., Chicago.

The committee in charge of the competitions is under the chairmanship of S. M. Brah of the International Correspondence Schools, Chicago. Serving with Mr. Brah are:

Frank C. Cech, Cleveland Trade School, Cleveland, Ohio.

H. L. Charlson, American Steel Foundries, E. Chicago, Indiana.

J. Morgan Johnson, Tri-City Manufacturers Association, Moline, Ill.

C. W. Wade, Caterpillar Tractor Co., Peoria, Ill.

James G. Goldie, Cleveland Trade School, Cleveland, Ohio.

These contests, started in 1924, have been especially helpful in building up interest in organized trade training. Last year some 140 foundries and pattern shops entered boys in the competitions sponsored by local groups.

Gating and Risering Contest Castings

THE annual apprentice molding contests present a most interesting study of gating and risering castings and show the general lack of agreement of practices prevalent in various shops. In these contests identical patterns are sent around to the various shops having apprentices in the competition, each contestant then using his own judgment as to gating and risering arrangements. Above are shown some of the castings entered in the national contest at Chicago last May. Castings 1, 2 and 3 are of steel, 4, 5 and 6 of gray iron, while 7, 8 and 9 are of brass or bronze. The different methods followed, which are indicative of the plant practices, emphasizes the need for an intense study of the theoretical as well as the practical means for producing sound castings with the least amount of metal possible to produce the casting. In this connection, attention is called to three papers on gating and risering presented before the last three conventions, namely, the papers by C. C. Brisbois and A. E. Cartwright, by M. A. Scott and by A. K. Higgins.

"... As Others See Us"

(Reprinted from "Random Shots," Foundry Trade Journal, London, August 1.)

Quad City Chapter to Note

"WHILST here in England the activities of the I.B.F. are strictly on a war basis, it is stimulating to read of the many enterprising activities of the A.F.A. still going on in the States. Over there the Branches are known as 'Chapters' and amongst the chapters that of Quad City always seems very prominent. Maybe though it is not really more so than any other but, to an Englishman, the name stands out more than just 'St. Louis' or 'Wisconsin.' It would be a fine publicity stunt if (after the war) the A.F.A. were to send an invitation to our British foundrymen to 'Come spend a fortnight in Quad!' For the benefit of non-English readers, Quad is the place you go to for persistently stealing your mate's tools or for printing false information on the company's balance sheet."

New Chapter Chairmen

Glenn Coley, Detroit Chapter

Glenn Coley, metallurgist, Detroit Edison Co., Detroit, Mich., was elected to the chairmanship of the Detroit chapter recently. Mr. Coley was born in Pittsfield, Ill., and attended the grammar school and high school in that city. He was graduated from the University of Illinois in 1917. Upon terminating his formal education he was employed for one year at the Illinois Steel Co., serving first in Gary, Ind., as a foreman and later in the year at South Chicago, Ill., as a chemist. For five years he was associated with the Timken Detroit Axle Co., Detroit, Mich., as assistant metallurgist. In 1924 he became affiliated with the Titusville Forge Co., Titusville, Pa., as metallurgist. He returned to Detroit in 1928 to take his present position with the Detroit Edison Co.

Besides being an active member of the A.F.A., Mr. Coley is a member of A.I.M.E., A.S.M., S.A.E., American Electrochemical Society and the American Association for the Advancement of Science.

Glenn Coley

R. J. Allen, Chairman, Metropolitan New York-New Jersey Chapter

Russell J. Allen, elected chairman of the Metropolitan New York-New Jersey Chapter for the coming year, is a native of Port Huron, Mich., receiving his technical training at the University of Toronto, from which he was graduated in 1913. From 1919 to 1930 he was with the Rolls Royce of America, Inc., at its Springfield, Mass., plant as metallurgist. He then accepted his present position as metallurgist with the Worthington Pump

R. J. Allen

and Machinery Corp. at Harrison, N. J. Mr. Allen is especially active in Association work, for in addition to his connection with the A.F.A., he holds memberships in the American Society for Metals, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, American Petroleum Institute and the British Iron and Steel Institute.

W. O. McMahon, Birmingham District Chapter

W. O. McMahon, a leader in the foundry industry of the Birmingham, Ala., district, was elected to head the A.F.A. Birmingham District Chapter for 1940-41. Born in Alabama, he received a degree of B.S. from the University of Alabama in 1916 and M.S. in chemistry and metallurgy in 1917. Since then he has held metallurgical positions with the U. S. Pipe and Foundry Co. (6 years), Utah Copper Co. (1 year), National Cast Iron Pipe Co. (2 years), Stockham Pipe Fittings Co. (2 years), and since 1927 has been acting as foundry metallurgist for the Sloss-Sheffield Steel and Iron Co. As a member of the Sloss-Sheffield staff he has acted as assistant editor and a contributor to "Pig Iron Rough Notes," which has become popular with foundrymen. Mr. McMahon has been an active worker in the Birmingham Chapter since its organization. He is also active in the work of the American Society for Testing Materials.

W. O. McMahon

F. Ray Fleig, Northeastern Ohio Chapter

Elected to serve the Northeastern Ohio chapter as chairman for one year has been F. Ray Fleig, vice-president and general manager, The Smith Facing and Supply Co., Cleveland, O. He was born in Cincinnati, O., but was educated in the public schools of Belleville, Ill. He also attended the Illinois Academy in Urbana, Ill. Continuing his education in Urbana he studied at the University of Illinois and was graduated from that school. Following his graduation he became connected with The Smith Facing and Supply Co.

F. Ray Fleig

Mr. Fleig has been an active member of the Northeastern Ohio chapter. He served on the chapter's board of directors until 1939, when his term of office expired, and then was elected vice-president of the chapter last year.

Mr. Flieg has been vice president of the company since 1913, was made assistant manager in 1920, and general manager in 1930.

Development of Some Gating and Feeding Methods For High Duty Alloys—II

By A. E. Cartwright* and C. C. Brisbois†, Montreal, Canada

The first section of this 1940 exchange paper, presented to the Institute of British Foundrymen by the American Foundrymen's Association, appeared in the September issue and dealt with the experiences the authors had with direct pouring methods. In this the second and concluding part of the paper the authors continue to convey an idea of the extent in number and variety of design for which the direct pouring methods have been found useful.

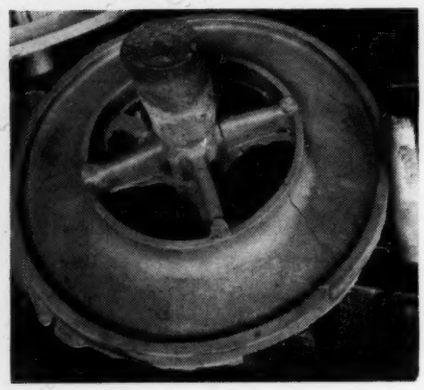


Fig. 14—Wrong method of molding a monel centrifuge casting.

IN UTILIZING these methods of direct pouring into feeding heads over a four-year period, some limitations in their applicability have, naturally, come to light in various forms and degrees. The more important of these limitations are described and some notes of caution based on our experiences, are included.

An attempt was made to produce the monel centrifuge casting illustrated in Figs. 14 to 17, by means of a single direct-poured feeding head on the hub. The casting was of difficult design and dimensions, and the result, by this method, was a casting badly cracked in arms and outer section, caused by too long maintenance of high temperature in the hub by the pouring head.

We were recommended, from an outside source, to mold the centrifuge as shown in Fig. 14, with the hub extension down in the drag and surrounded with external chills. Chills also were placed under the outside rim. A separate gate entering the hub was to be used, the remains of which are visible in the picture. Between the arms a loose mixture of sawdust, sand, and ashes was rammed and as soon as it was deemed safe after pouring, the cope was lifted and the hub and arms freed. However, the result was very similar to that of the first effort in regard to strain cracks.

Following this experience, it was decided to adopt a rather radical procedure for a third trial. We believe that this procedure, in view of the result obtained, may be of interest and assistance to others faced with a similar problem. A skeleton insert of the design shown at *C*, Fig. 15, was cast in monel. The mold for the main casting was

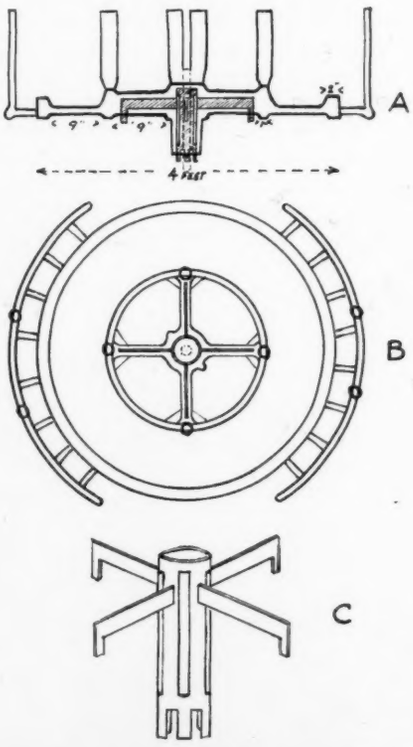


Fig. 15—A and B—Gating method and location of skeleton insert for satisfactory casting. C—Design of insert shown in A and B.

Fig. 16—Satisfactory casting before cleaning.

designed with gating as shown in *A* and *B*, Fig. 15. The skeleton, after thorough cleaning, by sand blasting, was placed in the mold as indicated in the diagram, the extensions on bottom and arms of the insert being firmly bedded in the main sand mold.

The relative section sizes were such as to leave at least from ¾ to 1-in. between the insert and every part of the adjacent mold wall and core, with the exception of the supporting points. It was considered that the insert would so function as to accelerate cooling in its locality; that it would either completely melt into the mass of molten monel or, on the other hand, if it retained its form, would act as a reinforcement against possible, though doubtless lessened, contraction stains in the arms.

The casting so produced was apparently perfectly sound and satisfactory. As will be seen, the only points at which an examination of the effects of the insert was possible were the supporting prints in the hub and on each arm. Figs. 16 and 17 show this casting before cleaning, and the protruding ends of the in-

*Metallurgist, The Robert Mitchell Co., Ltd.
†Foundry Superintendent, The Robert Mitchell Co., Ltd.

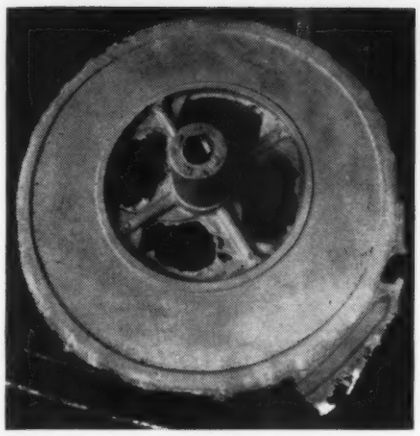


Fig. 17—Reverse side of satisfactory casting before cleaning. Note protruding points of skeleton insert.

sert are visible. Each protrusion was examined minutely; chipping, grinding, filing and subsequent machining failed to reveal the outline of the insert below the surface so treated.

Using Internal Chills

The use of internal chills has been criticized by some authorities; Batty, for example, refers to their being "potentially dangerous as isolated bodies in what should be a homogeneous structure."[5] The authors do not agree wholeheartedly with this view, believing that, in common with many other foundry procedures, their usefulness depends on the judgment used in proportioning. Relation between the dimensions and bulk of the parts carrying the internal chill, and those of the chill itself, must be carefully considered, as well as the location of gates and requisite pouring temperature of the metal to come into contact with the chills. Too large a chill, in proportion to the size of the casting section, will certainly result in a dangerously unhomogeneous structure; on the other hand, a too small one will be ineffective in its purpose.

Figs. 18 and 19 show two designs of turbine castings, made in a 4 per cent silicon bronze, that were successfully produced by direct top pouring through feeding heads, without the use of internal chills. Figs. 20 and 21 show a turbine casting composed of a similar alloy that was not successfully made by this method, owing to excessive temperature in the locality of the pouring heads resulting in cracking of the blades. For this particular pattern silicon bronze internal chills were cast and inserted in the cores, forming the central heavy ring section as illustrated in Figs. 22 and 23. Fig. 22 shows the upper core (which should be viewed inverted), while Fig. 23 is a half core of the complimentary underside of the central heavy ring. The casting was gated as shown—the metal first entering at the bottom of the casting at a number of points and, subsequently, entering the top ring section through separate branch gates to ensure ample temperature of the metal encountering the internal chills. Protruding points of some of the internal chills are visible in the inner ring of Fig. 21. The initial pouring temperature of 2100°F. (1150°C.), while for direct pouring, without chills, the pouring temperature was about 2000°F. (1090°C.).

With regard to strainer cores, it is not as efficient to use a single relatively large hole to clean the metal stream as to use a sufficient number of small holes of approximately the dimensions recommended earlier in this paper. There is too much tendency for a single large hole to form a vortex into which slag and dirt may be drawn, particularly when the metal is on the hot side and very fluid. In an emergency, where metal is so cold as to freeze and block the small holes of the strainer it may be necessary to enlarge the holes for the time being, but melting practice should be remedied to overcome the difficulty, rather than to

[5]Batty, G., *"Controlled Directional Solidification,"* TRANSACTIONS, American Foundrymen's Association, vol. 42, p. 237, 1934.

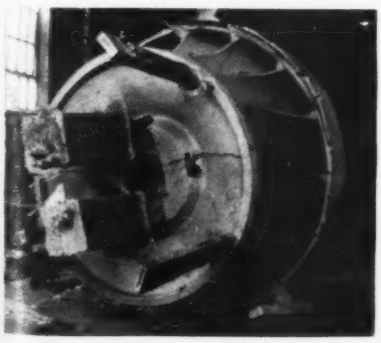


Fig. 18—Turbine casting made in silicon-bronze with direct-pour feeding head.

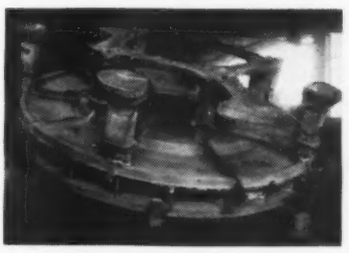


Fig. 19—Silicon-bronze turbine casting, 3000 lb. net weight, fed with inner five direct-pour heads and outer five indirect-filled feeding heads.

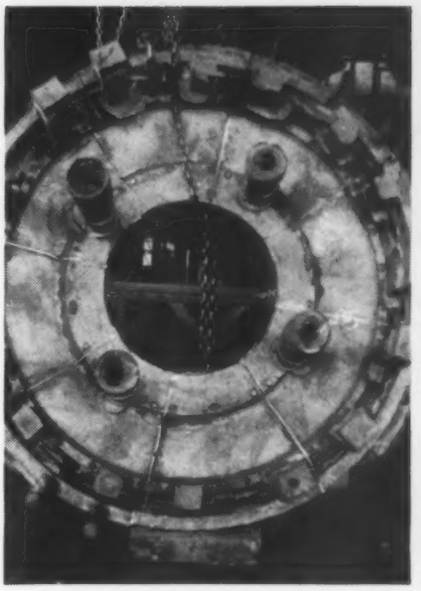


Fig. 20—A casting which was not successfully produced by direct-pour methods. Internal chills were used.

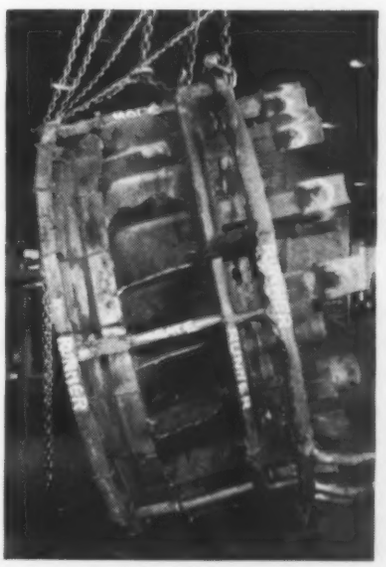


Fig. 21—The same casting shown in Fig. 20. Note the protruding internal chills.

Fig. 22 — Core for the silicon-bronze casting shown in Fig. 20.

make the use of large holes in the strainer standard practice.

Indirect vs. Direct Filled Feeding Heads

Indirect-filled feeding heads should not be used in close proximity to direct-filled feeding heads. It is frequently necessary to use indirect-filled heads to feed sections isolated from the direct-poured heads by thinner sections. If, however, both kinds of heads are used on the same heavy section there is a tendency for the indirect-filled heads to be themselves fed sound at the expense of the casting section. For example, the outer ring of the turbine in Fig. 19 is separated by a relatively light section from the inner ring carrying the direct-filled heads, and is served by indirect-filled feeders. On the other hand, the heads of a Ni-hard dredge pump liner in Fig. 24 were all directly filled by two nearly semi-circular pouring basins. The temptation to cut down the size of the pouring basins, allowing two or more of the heads to be indirectly filled, would result, experience has shown, in shrinkage from the castings into the heads and a worse condition in the casting than if the fewer direct-filled heads only were used.

Light aluminum alloys have not been successfully produced by these methods owing to their tendency to occlude mold gases and trap oxide dross. Manganese and aluminum bronzes are not satisfactorily handled by these methods owing to extreme drossing at the pouring temperature. The high zinc alloys (including nickel silvers) not containing aluminum were satisfactorily so produced, as also the silicon bronze.

For alloys of moderate liquid shrinkage and relatively long freezing range, there is usually not much to be gained by direct-pouring through feeding heads. Tin bronzes, especially those carrying appreciable quantities of lead or phosphorus, are more liable to segregation, particularly if poured too hot. Even with some of the more suitable alloys, particularly a complex alloy such as nickel silver, too high a pouring temperature will result in segregation, large weak crystal zones and porosity. Soft gray irons of high silicon and total carbon content should not, in any event, be used for castings of heavy section, but when direct-poured through feeding heads they are increasingly liable to porosity due to coarse graphitization and tendency to kish formation.

Conclusions

It will be gathered, from the above description, that the authors believed that there was room for research into molding and gating practices for the purpose of keeping in step with progress in metallurgical developments. The ever increasing diversity of casting designs and special characteristics of various high duty alloys developed and being developed makes unreasonable the horizontal continuance of production methods good enough in times past for alloys contemporary with those times.

In consideration of the fact that such methods of introducing molten metal into molds as those herein described have been, generally speaking, universally avoided, the illustrations included purposely consist mainly of photographs taken from routine production in the foundry with which the authors are associated. These, it is assumed, will

Fig. 23—Setting the monel metal internal chills in a half-core.

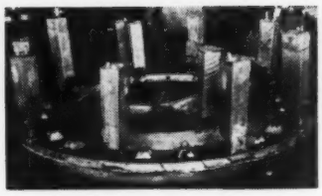


Fig. 24—A Ni-Hard dredge pump liner directly filled by two nearly semi-circular pouring basins.

appear more convincing and informative to the practical foundryman than would mere diagrammatical illustrations of what might be thought an abstract theory. The number of illustrations included, while being more than enough to illustrate the method of application, may be excused on the ground that they serve to convey an idea of the extent in number and variety of designs for which the methods have been found useful.

It is not meant that direct feeding head pouring is uniformly applicable to all designs other than the exceptions discussed; for many castings, particularly those having no complications in sectional design, it is freely admitted, and indeed emphasized, that the more ordinary gating methods are adequate and more economical. Nevertheless, a large proportion of the varied designs passing through our foundry have most profitably been adapted to this method of production, and the resultant castings have, in many instances, shattered standing records of service life. Therefore, it is hoped that the information contained in this paper will be of interest to the foundrymen generally and a stimulus to further investigation into methods directed toward the still greater prestige of foundry products.

Acknowledgments

The authors desire to thank their principals, the Robert Mitchell Co., Ltd., for permission to present this paper and for their encouragement throughout the development of the methods herein described.

NEW MEMBERS

Canadian Section

Joliette Steel, Limited, Joliette, Que., Canada (Wm. C. Wall, President)*

Central Indiana Chapter

Darrell I. Davy, Asst. Plant Mgr., Indiana Gas & Chemical Corp., Terre Haute, Ind.

Victor L. Johnson, Pattern Shop Foreman, International Harvester Co., Indianapolis, Ind.

Central New York Chapter

Luther Caldwell, Gen'l Foreman, Elmira Foundry Co., Elmira, N. Y.

David Dudgeon, Jr., Plant Engr., Utica Radiator Corp., Utica, N. Y.

M. J. Hulett, Foreman, Elmira Foundry Co., Elmira, N. Y.

Delmar L. Jones, Foreman, Elmira Foundry Co., Elmira, N. Y.

Thomas F. Kelly, Foreman, Utica Radiator Corp., Utica, N. Y.

Jacob P. Kratz, Asst. to Iron Fdy. Supt., Crouse-Hinds Co., Syracuse, N. Y.

John F. Livingston, Asst. Plant Engr., Crouse-Hinds Co., Syracuse, N. Y.

Adam Mahonske, Melting Foreman, Elmira Foundry Co., Elmira, N. Y.

Donald P. McCann, Cleaning Foreman, Elmira Foundry Co., Elmira, N. Y.

James O. Ochsner, Jr., Sand Control Lab., Crouse-Hinds Co., Syracuse, N. Y.

Wm. G. Parker, Sand Technician, Elmira Foundry Co., Elmira, N. Y.

Le Val Saxbury, Foreman, Elmira Foundry Co., Elmira, N. Y.

Max Winieski, Molding Foreman, Elmira Foundry Co., Elmira, N. Y.

Chicago Chapter

Laurence H. Carr, Research Metallurgist, Edward Valve & Mfg. Co., East Chicago, Ind.

C. C. Hermann, Claude B. Schneible Co., Chicago, Illinois

Charles McCurdy, Asst. Melting Foreman, Crane Co., Chicago, Ill.

A. E. Olson, Foreman, Link-Belt Co., Chicago, Ill.

Erle F. Ross, Chicago Editor, The Foundry, Chicago, Ill.

Cincinnati Chapter

Emmet J. Allen, Salesman, Pittsburgh Coke & Iron Co., Cincinnati, Ohio

Detroit Chapter

General Foundry & Mfg. Co., Flint, Mich. (A. D. McCaughna, President)*

Ralph J. Hutchinson, Detroit, Mich., Sales Engr., American Air Filter Co., Louisville, Ky.

Metropolitan Chapter

Ernest Cirangle, Jr., Production Clerk, Eclipse Aviation Div., Bendix Aviation Corp., Bendix, New Jersey.

Ralph D. Ferguson, Supt., Eclipse Aviation Div., Bendix Aviation Corp., Bendix, N. J.

Fred A. Foxall, Asst. Fdry. Mgr., Eclipse Aviation Div., Bendix Aviation Corp., Bendix, N. J.

A. John Mardick, Fdry. Metallurgist, Eclipse Aviation Div., Bendix Aviation Corp., Bendix, N. J.

Frank L. Middleton, New York, N. Y., Sales Repr., Ajax Metal Co., Philadelphia, Pa.

William Wilson, Jr., Fdy. Supt., Eclipse Aviation Div., Bendix Aviation Corp., Bendix, N. J.

Normal E. Woldman, Chief Metallurgist Engr., Eclipse Aviation Div., Bendix Aviation Corp., Bendix, N. J.

Northeastern Ohio Chapter

Glenn L. Bierly, Manager, Mansfield Brass Foundry, Inc., Mansfield, Ohio

Robert J. Harding, Partner, Elyria Brass & Bronze Foundry Co., Elyria, Ohio

Northern California Chapter

Howard Grafton, Works Metallurgist, Columbia Steel Co., Pittsburg, Calif.

Ontario Chapter

David Fraser, Galt Brass Co., Galt, Ont.

Philadelphia Chapter

John Finnegan, Purchasing Agent, Schulte & Koerting Co., Philadelphia, Pa.

Louis S. Johnson, Fdry., Supv., The Midvale Co., Nicetown, Pa.

St. Louis Chapter

Dale Arnette, Wood Pattern Maker, Key Co., East St. Louis, Ill.

Southern California Chapter

Caswell & Co., Los Angeles, Calif., (John Caswell, Manager)*

John Allen Haydon, Reliance Regulator Co., Alhambra, Calif.

Wm. R. Magoffin, Partner, Caswell & Co., Los Angeles, California.

Western New York Chapter

Kenneth S. Cowlin, Sales, Electro Refractories & Alloys Corp., Buffalo, N. Y.

David Stein, Chemist, Jewell Alloy & Malleable Co., Inc., Buffalo, N. Y.

Wisconsin Chapter

Leon Decker, Supv., Planning and Timestudy, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Alsey Ritsch, Supt. of Plant, Pollard Oil Products Co., Milwaukee, Wis.

Sadek Bros., Inc., Milwaukee, Wis. (M. Sadek)*

Hubert C. Stone, Belle City Malleable Iron Co., Racine, Wis.

D. W. Thiem, Vice Pres., Pollard Oil Products Co., Milwaukee, Wis.

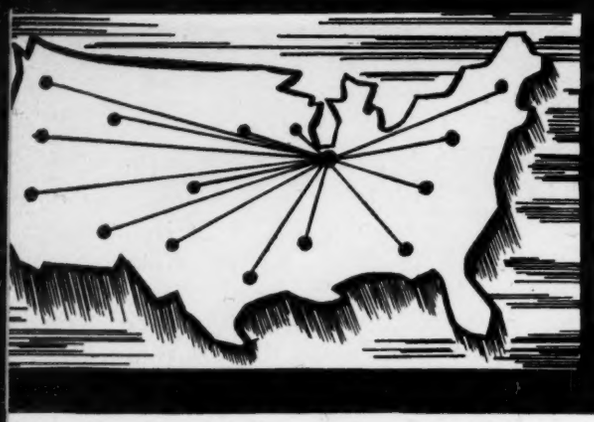
Outside of Chapter

Clark C. Adams, Gen'l Foundry Foreman, Bethlehem Steel Co., Sparrows Point, Md.

Alfred Carter, Cooper-Bessemer Corp., Mount Vernon, Ohio

John W. Greenstreet, Supt., Maryland Car & Wheel Co., Baltimore, Md.

*Company Members.



Chapter Activities

Col. Armstrong Speaks at Wisconsin Chapter Meeting

By H. C. Waldron*, Milwaukee, Wis.

THE Wisconsin chapter held their first meeting of the 1940-41 year at the Schroeder Hotel, September 20. Some 184 members and guests were present to hear Colonel Donald Armstrong, Chicago Ordnance District officer. Chapter President B. D. Claffey presided over the evening meeting.

Following the presentation of an interesting film shown through the courtesy of the American Metals Products Corp., President Claffey introduced the main speaker of the evening. Col. Armstrong was received with much enthusiasm by those present.

In making his address Col. Armstrong stressed the functions of the several Ordnance departments spread throughout the United States. Among the duties of these departments it is of primary importance for them to know what equipment and materials are procurable in their respective districts. They make production studies in reference to the transformation necessary in shifting from one type of work to another. It is the Ordnance department's wish to help industry meet the high standards that are required for this type of work, and also to reassure and seek co-operation.

Due to the lack of a measuring stick tremendous surpluses were built up during the last war, the procurement plan under way at the present time is designed to prevent such a recurrence on our rearmament program.

Col. Armstrong stressed the importance of educational orders, sighting instances in which such orders expedited delivery at a much reduced final cost to the government. Mr. C. R. Messinger, president, Chain Belt Co., also Assistant Chief of the Ordnance Department, elaborated on this in detail.

In conclusion Col. Armstrong stated that the Ordnance office was ready for work and that he felt that the Milwaukee area would soon feel the effect of the national defense program to a great extent.

*Secretary, Wisconsin chapter and Asst. Fdry. Supt. and Met., Nordberg Mfg. Co.

J. J. Ryan Dies

The Wisconsin chapter regrets to announce the passing of one of its old-timers, J. J. Ryan, who died on Saturday, October 5. Mr. Ryan was one of the several in the Milwaukee group who had served over 50 years in the foundry industry.

Chicago Foundrymen Play Golf, See Rodeo at Outing

WHEN is a foundryman not a foundryman? If you would have been present at the Lincolnshire Country club Saturday, September 26, you would have probably solved that riddle by now. In case you still do not know the answer, it is "at an outing."

However, there were a few on hand that seemed to be pursuing their various forms of making a living; especially on the golf course. There, if you could see through dust, raised by many a club, you would find, for example, rammers hard at work on the greens trying to ram the ball in the cup; pourers on the tees ready to "tap" the ball and pour it down the middle, which was not often; and molders nonchalantly molding "synthetic" sand tees.

Those who were not old enough to enjoy a golf game found plenty to do to while the time away. "Barnyard golf" took the fancy of some of the men and they proceeded to show that horseshoe pitching was not a lost art to the foundryman.

Further entertainment, during

(Continued on page 13)

Wisconsin chapter meeting notables. (Left to right): C. R. Messinger, president, Chain Belt Co.; Colonel Donald Armstrong, speaker, and Chapter President B. D. Claffey.

(Photo courtesy John Bing, A. P. Green Firebrick Co.)

Two golf quartets, at Chicago outing, stop for a last look at civilization and mankind before embarking on their golf game.

(Photos courtesy James Monroe, Whiting Corp., Harvey, Ill.)

the afternoon, was furnished by a preview "world series game" between the iron men and the steel men. The outcome of the classic was a victory for the slugging steel men.

The highlight of the day was the presentation of Texas Rand's rodeo. It was a real wild west show featuring trick riding, hurdling, lariat tricks, pony express riding and all the trimmings that go to make up an old wild west rodeo.

Following the activities of the day 800 foundrymen gathered under the big tent to get something for that huge appetite they had worked up during the afternoon's events.

The prizes for golf and other sports were awarded to the winners after the meal was completed. Immediately after the prizes were handed out a floor show was presented and everybody sat back to watch and have a good time.

Congratulations should go to P. V. Martin, chairman, entertainment committee, Carnegie-Illinois Steel Co., and all his committeemen for the splendid show they put on during the afternoon and evening. A good time was had by all and each year finds the attendance growing; which is enough to show how much everyone enjoys themselves at a Chicago chapter outing.

Gregg Talks at Western New York

By Eliot Armstrong*, Buffalo, N. Y.

THE Western New York chapter, formerly the Buffalo chapter, was also one of the numerous A.F.A. chapters to hold its initial 1940-41 meeting during October. Over 70 members and guests were present at this first meeting to hear a talk on "Cupola Practice" as presented by A. W. Gregg, Whiting Corp., Harvey, Ill.

Chapter chairman John C. McCallum, McCallum Hatch Bronze Co., Inc., presided over the meeting and in the course of events turned the meeting over to Robert K. Glass, chapter vice-chairman, Republic Steel Corp., who introduced Mr. Gregg to the chapter members.

The speaker gave a very interesting talk on cupola practice and, through the use of slides, showed many types of mechanical charging. Mr. Gregg's talk was both instructive and beneficial to the members, and they kept Mr. Gregg busy answering the many questions that were asked of him after he had presented his speech.

*Inter Allied Foundries of New York State and Secretary, Western New York chapter.

Barnett Speaks at Cincinnati

By H. M. Wood*, Cincinnati, O.

C. A. BARNETT, president and general manager, Foundry Equipment Co., Cleveland, O., was the Cincinnati chapter's main speaker, Tuesday, October 8. H. F. McFarlin, The Lunkenheimer Co. and chapter chairman, presided over the evening meeting.

Some 65 members gathered at the Hotel Alms to hear about "Recent Developments in Core Making and Mold Drying Practice," a topic in which a considerable amount of interest was shown.

Mr. Barnett, to make his talk more informative and interesting, used slides during his presentation to illustrate applications of the developments he discussed. After completing his address to the chapter members the speaker led a discussion in various problems relating to core making and mold drying practice.

*W. W. Sly Mfg. Co. and Secretary, Cincinnati chapter.

Scenes from Chicago chapter outing showing how loc al foundrymen enjoy themselves at this annual affair.

(Photos courtesy James Monroe, Whiting Corp., Harvey, Ill.)

Plant Safety and Hygiene Discussed at Michiana

By A. H. Freeman*, Mishawaka, Ind.

MICHIANA chapter opened its 1940-41 season with a well attended and interesting meeting on "Safety, Hygiene, Good Housekeeping and Occupational Diseases." The program was presented by members of the organization of Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. M. F. Doty, Clark Equipment Co., Buchanan, Mich., chapter chairman, presided.

In opening the meeting, Chairman Doty welcomed members and guests and urged them to take an interest in meetings of the chapter and to make this new season the most successful thus far. He then introduced George W. Cannon, vice president, Campbell, Wyant & Cannon Foundry Co., who stated that the program of safety, hygiene, good housekeeping and occupational diseases in effect in his plant was in his estimation a very worthwhile one. He pointed out that insurance costs in his plant had been reduced to such an extent that the saving easily paid for the cost of the program and, in addition, created better employer-employee relations.

Mr. Cannon then introduced Dr. C. M. Colignon, medical director of the company, who presented the main address. Dr. Colignon discussed the program of pre-employment examination in effect by the company and also the results of the periodic re-examination program. He pointed out some of the findings and what the company was doing not only to keep their men in good physical condition, but also outlined a program that the company had embarked upon some time ago of reclaiming men for employment who were afflicted by hernia. He also outlined the steps taken to keep the plant clean and what is being done to enforce their safety regulations and to impress them on their employees.

In discussing occupational diseases, Dr. Colignon pointed out that rapid changes in temperature, for example, pouring in very cold weather or in bad drafts, had a very important affect on lung diseases and illnesses. Proper methods had been adopted to overcome this difficulty.

In speaking of the reasons for rejection of applicants, he pointed out that heart complications were responsible for most of them, but that rejections were very low, being in the neighborhood of 0.2 per cent. He also pointed out that in their health program they kept track of those who were not 100 per cent physically perfect and how the company co-operated with local physicians in the cases that demanded medical treatment. Following his talk, Dr. Colignon showed a series of slides illustrating the equipment and charts used in their hygiene program and also methods used in the shop to enforce their safety work.

E. W. Beach, engineering executive of the company, presided during a discussion period which was styled after the "Town Hall Meeting of the Air." Questions were asked by various members of the audience and were referred to Mr. Cannon, Dr. Colignon or W. J. Barclay, personnel director of the organization, depending on the type of question. Most of the questions dealt with the various types of diseases found, proper treatment, and cost of the program.

That this was a very lively and interesting period is illustrated by the fact that the meeting did not adjourn until nearly 11 o'clock. Prior to adjournment, those present gave Mr. Cannon and his organization a rising vote of thanks for what they considered the most interesting meeting of the chapter thus far held.

*American Foundry Equipment Co.

"It's always fair weather when good fellows get together," sings the happy group in the center. The other four pictures help illustrate the good fellowship as carried out by members of the Chicago chapter at its outing in September. (Upper right) Pete Martin, chairman of the outing committee, talks on finance with Charlie Kawin, chapter treasurer.

(Photos courtesy Harry Orr, Burnside Steel Foundry Co., Chicago, Ill.)

Central Indiana Hears About Safety Codes

By R. A. Thompson*, Indianapolis, Indiana

JAMES R. ALLAN, assistant manager, Industrial Engineering, International Harvester Co., Chicago, launched the Central Indiana chapter off on a big year, Monday, October 7.

"Trends in State Regulatory Codes Affecting Safety in the Foundry" was Mr. Allan's choice for his evening lecture. Before about 115 local foundrymen, attending the first meeting of the year, over which chapter chairman I. R. Wagner, Electric Steel Castings Co., Indianapolis, presided, the speaker proceeded to cover his topic quite thoroughly. He informed his listeners that

*Electric Steel Castings Co. and Secretary, Central Indiana chapter.

(Continued on page 15)

sooner or later industries will all be regulated by the various codes which are gradually being set up for all industries.

A plant visitation trip was was made to the International Harvester Co., Indianapolis, Ind., during the afternoon. This was an opportunity that the chapter had been looking forward to for some time, for many of the members have not had the time to take a trip through this modern and up-to-date foundry.

Detroit Chapter Holds Golf Party

By O. E. Goudy*, Detroit, Mich.

THE Detroit chapter held its September meeting at the Pine Lake Country Club, Thursday, September 19. The sporty golf course selected gave the members and guests an afternoon of entertainment and cross-country hiking.

About 75 members and friends were present to enjoy the last of the chapter's summer outings. Most of those who attended this meeting participated in the golf tournament for some very attractive prizes.

Dinner in the evening was followed by the distribution of the prizes to the Sneads, Sarazens, Jones and Littles of the afternoon's golf performance. The awards were presented to the winners by the outing chairman, W. B. Crawford, Atlas Foundry Co.

*Kelsey-Hayes Wheel Co., and reporter for Detroit chapter.

Northern California Holds Annual Outing

By G. L. Kennard*, San Francisco, California

FRIDAY, October 11, has been looked forward to with a great deal of anticipation since the new officers and directors of the Northern California chapter assumed their duties on July 1. Now that date has passed, leaving behind it the memory of a wonderful time enjoyed by 70 members and friends who answered the roll call at Sequoyah Country Club, Oakland, Calif. The country club's golf course afforded stiff competition to the 30 golfers who toured its premises.

At the dinner meeting, chapter chairman Ivan Johnson attempted to break all records as being the master of ceremonies but instead broke the chapter's historic gavel. Following the presentation of a few honored guests and program chairman Jim Francis, who told the members something about the November 8 meeting, chairman Al Snow, entertainment committee, was introduced. Mr. Snow then relayed to all those who cooperated with his committee in making the outing enjoyable, his sincere appreciation for their good work.

Chapter vice-chairman Ed Welch was asked to hand out the prizes to the winners of the day's sports events.

The evening's activities were capped with "community singing" led by Ernie Carr and Pete Valentine.

*Northern California Foundrymen's Institute and Secretary-Treasurer, Northern California chapter.

New England Foundrymen Meet at Wentworth Institute

By M. A. Hosmer*, Boston, Mass.

WITH President LeBaron absent the Wednesday, October 9, meeting of the New England Foundrymen's Association, held at Wentworth Institute, Boston, was presided over by Charles Butler, Warren Pipe Co., Everett, Mass. The meeting was turned over to Frederick E. Dobbs, principal, Wentworth Institute, who welcomed the association to the school and then proceeded to tell the members and friends present, in a brief talk, the workings of the institute.

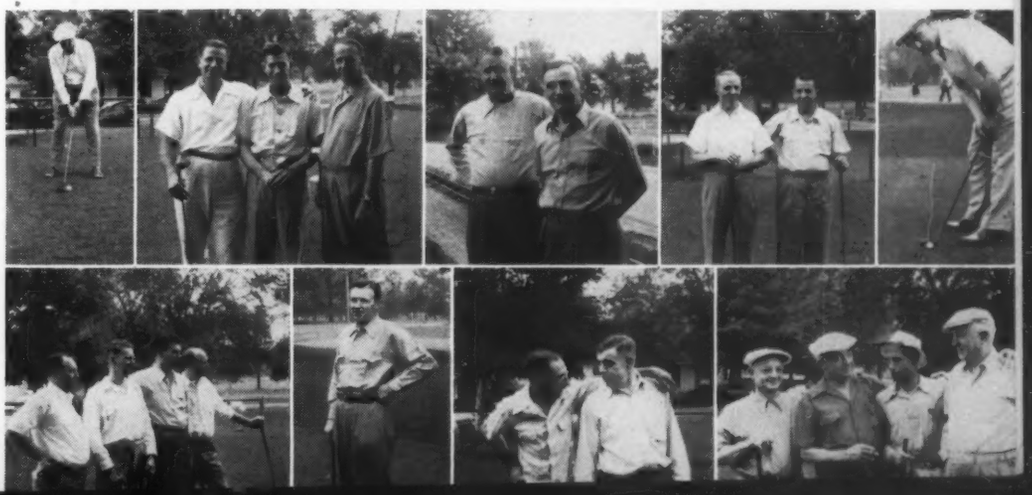
Mr. Dobbs stated that at the present time there were 600 day students and 800 evening students attending Wentworth Institute. The school was entirely of a technical nature, training men in practical arts. The idea of a technical school originally came from England, according to Principal Dobbs, and is probably today more prominent in that country than here, where great stress is laid on a college education in preference to technical and practical studies.

Mr. Dobbs explained that Wentworth now had the only foundry course in the country under the auspices of the government, operating under the National Defense Program, and at the present time there were twelve students in this course taken from W.P.A. workers and from the ranks of the unemployed.

At the conclusion of Mr. Dobbs' address, guides were furnished the visitors and a tour of inspection was made of the Institute. The departments of the school were working and the visitation proved to be most interesting and beneficial.

*Chemist, Hunt-Spiller Mfg. Corp. and reporter, New England Foundrymen's Association.

Pictures of September Detroit chapter outing.
(Photos courtesy H. M. Bringhurst, Semet-Solvay Co., Detroit, Mich.)



Northeastern Ohio Discusses Sand, Casting Cleaning and Core Blowing

By Pat Dwyer*, Cleveland, O.

REGULAR monthly meeting of the Northeastern Ohio chapter, Cleveland Club, October 10, was attended by approximately 130 members and guests and featured three addresses on sand treating and handling; cleaning of castings; and core blowing.

Lester B. Knight, Jr., vice-president, National Engineering Co., Chicago, devoted the first part of his address to a general consideration of characteristics and application of molding sand in connection with production of salable castings. Competition of other materials and increased fastidiousness of customers has made it imperative that greater attention should be paid to surface appearance. Reliability of the castings, freedom from interior and exterior defects are needed to convince buyers of the superiority of castings over other materials in many instances. He cited a recent instance in which high officials of the army and navy definitely opposed the use of castings for certain purposes, a type of moss grown opposition based on the familiar official mass inertia and a total unfamiliarity with the strides made in casting manufacture in recent years.

Claiming that a recent survey indicated that 60 per cent of all casting losses could be traced to the sand, he emphasized the necessity of close and intelligent control. Obviously, he pointed out, satisfactory results can be secured only through the use of mechanical equipment. He referred to the four principal variables, permeability; moisture; bond strength; and fines. Permeability and closely related feature, grain size, should be maintained at the maximum point that will not affect the smoothness of the casting. Naturally, this feature will vary with the kind of metal and with the weight and size of the casting. According to the speaker moisture is reduced and bond strength is increased through mechanical mixing. In new sand and more particularly in reclamation and treatment of old sand the removal of fines materially increases permeability and strength. Several typical sand conditioning installations were shown on the screen and brief reference was made to a new installation in which sand is supplied continuously from a completely automatic unit.

Following a brief reference to the importance of thoroughly cleaned casting, F. A. Ebeling, sales manager, W. W. Sly Mfg. Co., Cleveland, elaborated on the methods in vogue; blast cleaning, tumbling, pickling and hand cleaning. He claimed the two latter might be dismissed from consideration. The pickling process is no longer practiced to any extent and hand cleaning is confined to the smallest foundries. Items to be considered in the installation of cleaning equipment include: Abrasive, labor, replacement, repairs, interest on investment, depreciation and power. The speaker elaborated on each of these items, and continued with a description of the various types of equipment used in blast cleaning. He claimed that several small barrels usually were more economical to operate than one large barrel. He pointed out the advantages of tables and blast rooms. The modern blast room is well illuminated, well ventilated, dust is kept to a minimum and is quickly and efficiently removed. Except under special conditions the usual air pressure of 100 lb. is not necessary. From 60 to 80 lb. is sufficient under the majority of conditions.

The old type tumbling barrel now is available in modern design, equipped with individual motor drive, start and stop control, a brake which holds the barrel in any desired position, and a reversing switch. Greatly increased cleaning effect is secured by running the mill for a short time in reversed direction. Plenty of hard iron stars are required for proper results. The continuous type tumbling mill available in various sizes is used for rough cleaning of small castings and in some instances for a combination cooling and cleaning.

Russell F. Lincoln, sales manager, Osborn Mfg. Co., Cleveland, discussing core blowing machines, stated that the success of the process depended on three main factors; the machine, the corebox; and the sand. With the first two designed, constructed and operated properly, sand mixtures may be developed to serve satisfactorily in a wide range of cores. With the aid of several slides he explained the principles of the machine, how it is operated and the many advantages it presents under favorable conditions. Up to the present, machines have been built capable of producing cores weighing 50 lb. and measuring 36-in. in length.

*"The Foundry" and Reporter, Northeastern Ohio chapter.

Robinson Addresses Philadelphia on Cores

By J. T. Fegley*, Philadelphia, Pa.

THE Friday, October 11, meeting of the Philadelphia chapter was held in the Engineers Club with an attendance of 125.

The technical meeting was in charge of Roger Keeley, chapter chairman, who introduced L. P. Robinson, Werner G. Smith Co., Cleveland, O., and a national A.F.A. director, to the members and guests present at the meeting. Mr. Robinson proceeded to give a practical talk on cores. He brought out the fact it was essential that core sands be stored under cover, that binders are properly mixed and, above all, to know your ratios and moisture content; do not guess, for that gives disastrous results. He stated further that there is a definite mixing time for proper

*North Bros. Mfg. Co. and chairman, Publicity Committee, Philadelphia chapter.

(Continued on page 17)

preparation of cores and it is a common error in foundries to disregard this and mix the sand too long. Improper baking and too little inspection are causes for a lot of foundry rejects. A well controlled foundry never loses a casting on account of a core—for if a core is no good it should be thrown away so it cannot be used. A lively question and answer period followed this talk and many of the members and guests participated.

Following the dinner Lee Harris, Link Belt Co., introduced Dr. Stanley P. Reimann, professor of pathology, University of Pennsylvania, and director of cancer research, Lankenau Hospital. Mr. Reimann gave a short and excellent "coffee talk" on "What is being done to fight cancer."

Present at this meeting was C. E. Hoyt, executive vice-president, who responded to an invitation to address the meeting.

N. I.-S. W. Visits Plant, Hears Woodliff on Sand

By J. R. Cochrane*, Rockford, Ill.

A NEW twist was given the Tuesday, October 8, Northern Illinois-Southern Wisconsin monthly chapter meeting, when in conjunction with the evening's program, an afternoon tour of the Fairbanks Morse & Co. plant, Beloit, Wis., was made. The evening meeting was unique, too, as it was held in the employee's dining room, Fairbanks Morse & Co., with P. A. Paulson, Gunite Foundries, in the chair.

As the speaker of the meeting Chairman Paulson presented E. E. Woodliff, Harry Dietert Co., Detroit, Mich. Mr. Woodliff chose as his subject "Sand Testing and Its Application to Foundry Problems."

The speaker gave an illustrated talk demonstrating and putting into actual service, on the lecture table, equipment manufactured by his company. He tested samples of sand brought in by members from their various foundries. He showed the fallability of judging sand condition by feel alone, and stressed the importance of using skilled labor in tempering and cutting sand heaps and mixing facing sand. Following his talk Mr. Woodliff presided over a discussion of foundry sands and casting defects as caused by faulty sand preparation.

*Metallurgist, Sundstrand Mach. Tool Co., Fdry. Div., and Technical Secretary, Northern Illinois-Southern Wisconsin chapter.

Ontario Chapter Greets Vice-President Simpson

By G. L. White*, Toronto, Ont.

UNDER the leadership of chairman Douglas Storie, Fittings, Ltd., Oshawa, Ont., 110 foundrymen gathered at the Royal York Hotel, September 27, to welcome the chapter's speaker, association vice-president H. S. Simpson, National Engineering Co., Chicago. This huge turnout for the first chapter meeting of the 1940-41 season is indicative of what is to come when the meetings are in full swing later on this year and next.

Taking as his subject "The Marketing of Cast Metal Products," Mr. Simpson presented some pertinent facts and then threw the meeting open for discussion.

The speaker feels that the foundry industry has been fast asleep in a merchandising sense, while those interested in welding and forging have spent thousands of dollars to bring greater engineering and public acceptance for their products. The result of this situation has been that castings are given almost no consideration in the minds of many buyers and it is time for the foundry industry to educate users to the merits of castings.

To illustrate what can be done in this direction Mr. Simpson outlined a plan as conducted by a member of the foundry industry. This particular company has made remarkable advances in sales in recent years through a policy of taking engineering graduates, giving them a year of practical training in the foundry, sending them into the office for knowledge on costs and in general a thorough understanding of the company's policies, costs and manufacturing ability. They send these men out on the road to sell castings and aid the company in getting more and better business. This company recognized that it was no use making castings unless they could be sold, and their solution to the problem has been a most successful one.

In dealing with the piece price of an article Mr. Simpson stressed the fact that price enters too deeply into the selling of castings. He stated that manufactured articles should be sold at so much a piece rather than, as pig iron or non-ferrous metal, at so much per pound. Another practical illustration was used to show how a foundry met this difficult selling problem. A man took over a badly run down foundry and decided to produce one of the process irons. His losses were tremendous but he remedied the situation by making his men take a metallurgy course at the university near the city in the evening. After successfully producing his iron he was soon to find out that his customers knew little or nothing about his product or the type of casting he was making. He then proceeded to bring his customers into his plant and demonstrate, through lecturing, slides and illustrations, just what his product could do for their business. At this short course on the application of his castings to his

(Continued on page 18)

*Westman Publications, Ltd., and Secretary-Treasurer, Ontario chapter.

customer's needs, fifteen were present. At the last two-day conclave 350 assembled to hear what could be done by using his product.

Mr. Simpson feels that there was never a time which was more important in the history of Canada. He feels that the foundries should look to a period of great expansion. The industry will grow most successfully if, in addition to technical development, it does all that is needed to increase and encourage sales. The technical man will make an excellent salesman if he is given the proper training.

In the ensuing discussion, which was largely devoted to the relative merits of piece vs. pound price, interesting points were presented on both sides. In favor of the piece price, it was pointed out that the buyer could not so readily compare the piece price as he could the pound price with the unjustifiably lower figure which might be offered by a competitor. Another point in which the merits of the piece price were apparent was in the marketing of small brass castings. In this field it was pointed out that the quoting of 60, 70, or even 90 cents per pound for small brass castings was not out of line with the work involved but sounded like a high price to the customer. On the other hand, a price of 3 or 10 cents a piece would sound a lot better, while working out to the same rate per pound. In foundry pricing it was felt that foundries frequently neglected to charge for service which was really worth a great deal.

On the other side of the picture, it was pointed out that piece prices on many items would be rather difficult to arrive at and that the pound price worked very satisfactorily where a definite schedule was adopted by an industry, as in the case of the steel casting industry in Canada. The price per pound was also held to be very useful in figuring out costs in many instances by the engineer or buyer and where many small castings are being purchased the pound price eliminates the necessity of shopping around on a great variety of items.

Again in the discussion, it was reiterated that there was a great need for education of buyers in regard to castings and the service of the foundry industry. Few foundries are oragnized to sell to the best advantage. Summing up the argument in favor of the piece price, Mr. Simpson pointed out that a lighter, better casting might cost much more than a heavier one and would have to be considered as a manufactured article rather than as something at so much per pound, in order for the foundry to receive the value built into it for the customer. If castings are personalized, they would bring a better price and the foundry should strive to meet competition on the basis of a better product rather than on a lower price per pound.

St. Louis Holds Successful Round Table Discussion

By J. W. Kelin*, St. Louis, Mo.

THE Thursday, October 10, meeting of the St. Louis district chapter was featured by the largest attendance at any regular meeting in the chapter's history. One hundred and fifteen foundrymen and friends attended this dinner and the special round table discussion period that followed.

These discussion groups were separated into steel, gray iron and non-ferrous sections. D. J. Reese, International Nickel Co., New York, N. Y., spoke to the gray iron session on "High Test Cast Iron" and led in the active discussion period that followed.

Clyde Wyman, plant metallurgist, Oklahoma Steel Castings Co., Tulsa, Okla., was the speaker for the steel section. The subject of his talk was "Progress and Development of Manufacture of Electric Steel in the Last Quarter Century." A very interesting and active period of discussion followed Mr. Wyman's lecture.

The non-ferrous section was in the form of a "Bring Your Own Problem Forum." J. W. Kelin, Federated Metals Div., American Smelting and Refining Co., St. Louis, Mo., presided over this section of the conference. No set talk was given but the group attending brought sample castings, as well as casting problems, to discuss.

Following routine business, Carl Morken, Carondelet Foundry Co., St. Louis, presented a further report on the progress of the St. Louis district chapter's Elementary Foundry Practice School to be held beginning October 23.

Registration cards were passed out and the membership was urged to co-operate with the committee in stimulating interest in the school. The advance registration shows that considerable interest is being shown in the school as many are being enrolled daily.

*Federated Metals Div., A. S. & R. Co., and Secretary-Treasurer, St. Louis District chapter.

Southern California Discusses Ceramics

By William F. Haggman*, Huntington Park, Calif.

WITH the new chapter year getting under way 90 foundrymen and guests gathered at the Clark Hotel, Los Angeles, September 26, to participate in the first meeting of the season. Chapter chairman James Eppley, Kinney Iron Works, ruled over the evening affair.

The principal speaker of the meeting was A. Lee Bennett, ceramic engineer, research division, Gladding McBean Co. Mr. Bennett gave a history of refractory materials found in California and stressed the fact that

*Foundry Specialties Co. and Secretary, Southern California chapter.

Important!

Papers for 1941 Convention

EACH year some members submit papers which come in too late for review for acceptance at the annual convention. To prevent such disappointment in connection with the 1941 convention, members are urged to write at once to Association headquarters, giving information as to papers which they wish to submit to the program committee. Members are also invited to suggest topics which they believe should be covered by papers for the various sessions, listing names of those whom they believe should be invited to prepare these manuscripts.

Southern California had deposits of all types of refractories. He gave a fine talk on the many materials his company manufactured and showed samples of these products.

Prior to hearing Mr. Bennett speak, the chapter saw two movies entitled "Tobacco Land" and "Pleasure Time."

Baltimore Meeting Moves to Form Chapter

GREAT interest in the formation of a chapter in the Baltimore - Washington - Virginia area was indicated by splendid attendance of some 110 members and non-members at a foundry meeting held Oct. 14 at the Lord Baltimore Hotel, Baltimore, Md. Preceding the meeting, 87 of the group sat down to a dinner provided by the hotel management.

This meeting was the outgrowth of a movement started last fall during a regional foundry conference held at Baltimore when a chapter was advocated. Recently this meeting was organized by a local committee consisting of E. W. Horlebein, The Gibson & Kirk Co.; R. T. Covington, American Hammered Piston Ring Div., Koppers Co., and C. L. Frear, Bureau of Ships, U. S. Navy, Washington, D. C. Present to give a technical talk was L. P. Robinson, Werner G. Smith Co., Cleveland, at which Mr. Horlebein presided.

Mr. Robinson, or "Robbie" as he is familiarly known throughout the foundry industry, gave an exceedingly interesting and instructive discussion on "Core Practices." In his presentation he dealt thoroughly with some nine variables which must be strictly controlled to produce best results in obtaining satisfactory cores. Some of the variables discussed were: mixtures, moisture control, ratios, mixing time, baking procedures, venting and inspection. Some very pertinent points were emphasized in the discussion period following the talk.

After the technical discussion, R. E. Kennedy, secretary of the Association, presented some information on the procedure to be followed in forming a chapter. Following this, a motion was made from the floor that a petition be circulated requesting the A.F.A. Board of Directors to approve a chapter being organized. The motion was passed unanimously and a petition was signed.

Chairman Horlebein then announced that at a meeting which would be called for the latter part of November, a nominating committee would present names for consideration for election as chapter officers and directors and that another committee would submit a set of by-laws and a suggested name for what will be the 19th chapter of the Association. It was also announced that following the petition approval, plans would be set in motion to schedule a series of regular monthly meetings, these to be in cities of the area.

Chicago Chapter Opens Season With Defense Talk

By B. L. Simpson*, Chicago, Ill.

COL. Donald Armstrong, U. S. Army Executive Officer, Chicago Ordnance District, was the principal speaker at the first meeting of the 1940-41 season of the Chicago chapter. The meeting was held in the Chicago Towers Club with Chapter Chairman G. P. Phillips, International Harvester Co., Chicago, presiding.

After the usual dinner and following some announcements by Chairman Phillips, the meeting was turned over to Program Chairman L. L. Henkel, Interlake Iron Corp., Chicago, who introduced the speaker of the evening. He outlined Col. Armstrong's career, emphasizing his wide experience in both this country and abroad in ordnance matters. In his talk, Col. Armstrong brought out that the contribution of the foundry industry directly to national defense was rather limited although indirectly it was great. He pointed out that it was the foundryman who years ago brought about the improvement in casting of guns and in this respect, there appears to be a trend back toward gun casting after these ordnance materials had long been manufactured by other methods of fabrication. He stated that at the Watertown Arsenal they were very successfully casting guns of certain caliber and that these ordnances appeared to be extremely well adapted for their purpose. He also stated that present ordnance appropriations

*National Engineering Co. and Secretary, Chicago chapter.

required the expenditure of many times more money than was usual at peace times. He explained that the efficient expenditure of these moneys was based on the fact that the Ordnance Department had for many years made industrial surveys of the plants and capacities in the various industrial districts throughout the United States. As a result, they knew what could be manufactured and where.

He stated that many millions of dollars were being spent in the Chicago territory on various types of ordnance parts. He mentioned in detail the various materials and parts therefore that were being manufactured in the Chicago district, and pointed out that industry had always cooperated with him in his efforts 100 per cent, in fact, in many instances, industrial executives had gone out of their way to be of assistance to him in his work.

He then outlined the personnel of the Chicago Ordnance District office, pointing out that those in authority were civilians, as is the case in all ordnance districts.

During the question and answer period, the question of various types of cast metals for different gun parts and ammunition was brought up. Col. Armstrong stated that the Ordnance Department at this time had available materials which they felt were the best adapted to the particular purpose. These were not cast materials, and it was the opinion of the Ordnance Department that in any effort to substitute cast materials for those which are now being wrought, the burden of proof rests on the foundry industry and that it is the one who must bear the cost of experimentation and proof.

Dietert Lectures on Sand at Central New York

By L. D. Wright*, Geneva, N. Y.

AT the Onondaga Hotel, Syracuse, October 11, Harry W. Dietert, Harry W. Dietert Co., Detroit, addressed some 90 members on the subject "The Sand in Your Foundry." Frank Wheeler, Kinman & Wheeler, Syracuse, presided.

Mr. Dietert is scheduled to give four lectures on this subject before the Central New York chapter. Mr. Dietert presented the first lecture of the series, the others to follow at the next three consecutive meetings. These lectures are creating a lot of interest among the Central New York foundrymen and the turn-out for the first fall meeting was very gratifying to the chapter officers.

The speaker presented to each foundryman a booklet entitled "The Sand in Your Foundry" which is a condensed outline of the information available on foundry molding sands. Following this outline in his first lecture, Mr. Dietert explained under each heading or section the applicability of the information presented.

One of the interesting points brought out was the mating of molding sand and core sand. It was explained that core sand should be one sieve coarser than molding sand and that, by doing so, a foundryman will get a higher permeability and a better finish on his casting. It was also stated that high compression sands are suitable for work where cores are used and that the low compression sand should be used for plate casting.

The effect the clay content of the sand has on the centering point was clearly explained to the foundrymen by comparing the centering point of sand grains without any clay matter and the lowering of the centering point when clay is added. A 6 per cent addition of sea coal by volume will increase the centering point of any molding sand 100° and is therefore one of the beneficial effects of adding sea coal to the foundry heaps.

The effect that different methods of mixing sand have on the dry compression strength was illustrated to the members present.

Foundrymen of this area are looking forward to the second of Mr. Dietert's lectures which will be an illustrated lecture by the use of the high temperature furnace and other sand equipment.

*United States Radiator Corp. and Secretary, Central New York chapter.

A. S. T. M. Acts on Many Standards

AT the meeting of the American Society for Testing Materials in Atlantic City last June, action was taken on many specifications of interest to foundrymen. Among those accepted as tentative were:

1. Specifications for Refractories for Malleable Iron Furnaces, with Removable Bungs and for Annealing Ovens (C63-40T). This to replace present Specifications C63-39.
2. Revision of Methods of Sampling Coals Classed According to Ash Content (D492-38T).
3. Specifications for Leaded High-Strength Yellow Brass (Manganese Bronze) Castings.
4. Classification of Cast Copper-Base Alloys (B119-39T).
5. Specifications for Bronze Castings for Turntables and Movable Bridges and for Bearing and Expansion Plates of Fixed Bridges (B22-38T).
6. Specifications for Magnesium-Base Alloy Sand Castings (B80-38T).

Those Advanced to Standards include:

1. Specifications for Automotive Gray Iron Castings (A159-35T).
2. Specifications for Lightweight and Thin-Sectioned Gray Iron Castings (A190-36T).
3. Revision of specifications for Gray Iron Castings for Valves, Flanges and Pipe Fittings (A126-30).
4. Revision of Methods of Sampling Coal for Analysis (D21-16).

5. Revision of Methods of Laboratory Sampling and Analysis of Coal and Coke (D271-37).
6. Specifications for Steam or Valve Bronze Castings (B61-36).

The following specifications have been revised:

1. Specifications for Carbon-Steel Castings Suitable for Fusion Welding for Service at Temperatures up to 850°F. (A216-39T).
2. Specifications for Alloy-Steel Castings Suitable for Fusion Welding for Service at Temperatures from 750 to 1100°F. (A217-39T).

The marking clauses in both of the above specifications have been revised so that the marking of the manufacturer's name or trademark and the word "Steel" will not be required.

3. Specifications for Carbon-Steel Castings for Miscellaneous Industrial Uses (A27-39).
4. Specifications for Carbon-Steel and Alloy-Steel Castings for Railroads (A87-36).
5. Specifications for Alloy-Steel Castings for Structural Purposes (A148-36).

In Nos. 3, 4 and 5, the following change in each has been accepted by unanimous consent, subject to favorable letter ballot of Committee A-1:

Section 8 — Change paragraph (c) in Nos. 3 and 4 and paragraph (b) in No. 5 to read as follows:

"The yield point shall be determined by the drop of beam or halt in the gage of the testing machine, or by the use of dividers, or by an extensometer, at a crosshead not to exceed ⅛-in. per min. Where a definite yield point is not exhibited, the yield strength corresponding to a limiting permanent offset of 0.2 per cent of the gage length of the specimen shall be used instead. The "offset method" of determining yield strength as described in the Tentative Methods of Tension Testing of Metallic Materials of A.S.T.M. shall be followed. The tensile strength shall be determined at a speed of head not to exceed 1½-in. per min."

The same change was approved in Tentative Specifications for Carbon-Steel Castings Suitable for Fusion Welding for Miscellaneous Industrial Uses (A215-39T).

6. Specifications for Carbon-Steel Castings for Valves, Flanges and Fittings for High-Temperature Service (A95-36).
7. Specifications for Alloy-Steel Castings for Valves, Flanges and Fittings for Service at Temperatures from 750 to 1100°F. (A157-39).

In specifications Nos. 6 and 7 the marking clauses were modified so that the marking of the manufacturer's name or trademark and the word "Steel" will not be required.

In all the above specifications, the numbers indicated are those by which the specifications were formerly known. The new numbers have the number 40 appended either with or without the letter "T," depending on whether or not they are tentative or standard.

Book Reviews

The Metal Industry Handbook, 1939 Edition, 6x9, 440 pp., a large number of tables and illustrations, paper binding, published by *The Metal Industry*, 22 Henrietta St., London, W. C. 2, England.

This handbook seems to have considerable interest for non-ferrous founders and metallurgists. It is divided into four parts dealing with general properties and mechanical treatment of metals and alloys, pyrometry and metal cleaning; general data and tables; electro-plating, finishing and galvanizing; and miscellaneous.

The first section, devoted to general properties and mechanical treatment, deals with a considerable range of subjects. It includes general information on the properties of the principal non-ferrous metals, some ferrous metals, and some of the rarer metals. An entire section is devoted to commercial tin. Such information as the specific heats of a large number of metals and alloys, latient heat of fusion and of vaporization, expansion, heat of formation, comparative resistances, thermal and electrical conductivity and other properties are included.

Of special interest should be the sections devoted to specifications for non-ferrous alloys promulgated by the British Standards Institution, Air Ministry, Admiralty and A. S. T. M. A considerable list of proprietary alloys also is given. Several pages are devoted to the properties of light aluminum, magnesium, and nickel alloys. The remainder of the volume is devoted to discussions of various fabricating processes such as extrusion, stamping and pressing, and die casting; the effect of temperature on the properties of metals, heat treatment of non-ferrous alloys, melting, pyrometry, and deoxodizers and fluxes.

Section II contains tables of data such as hardness tables, weights and measures, linear weights of various types of non-ferrous rolled products, standard threads, temperature conversion tables, and load equivalents in British and metric measurements, etc.

Section III is devoted to electroplating, including discussions of the various steps in the process and the application of various types of coatings. Section IV is not of much interest to American readers, but may be so to Canadians as it contains information on various metal trade associations and technical, scientific, and research institutions in Great Britain.

Transactions, American Institute of Mining and Metallurgical

Engineers, vols. 133 and 135, Institute of Metals Division and Iron and Steel Division respectively, 6x9, 355 and 590 pp. respectively, both cloth bound, published by the A.I.M.E., 29 West 39th St., New York, N. Y.

As indicated, these two volumes cover the papers and discussions presented at the meetings of the divisions of the Institute in Detroit, October 17-19, 1938, and in New York, February 13-16, 1939. In vol. 133, several papers are of interest to the non-ferrous foundryman and metallurgist. Such papers are "Solubility of Lead and Bismuth in Liquid Aluminum and Aluminum-copper Alloys," by L. W. Kempf and K. R. Van Horn; "Plastic Deformation and Subsequent Recrystallization of Single Crystals of Alpha Brass," by M. R. Pickus and C. H. Mathewson; "Rates of Diffusion of Copper and Zinc in Alpha Brass," by E. Kirkendall, L. Thomassen, and C. Upthegrove; "Martensite Transformation in Beta Copper-aluminum Alloys," by A. B. Greninger; "Supposed High-temperature Polymorphism of Tin," by C. W. Mason and G. E. Pellissier; "The Plastic Flow of Metals," by C. W. MacGregor; and "Special Methods for Polishing Metals Specimens of Metallographic Examination," by D. Beregekoff and W. D. Forgeng. This volume also contains the Institute of Metals Division Lecture by Daniel Hanson on "Creep of Metals."

Vol. 135, devoted to iron and steel, is prefaced by the Howe Memorial Lecture, entitled "Some Things We Don't Know About the Creep of Metals," by Dr. H. W. Gillette. Of particular interest to gray iron foundry metallurgists should be the third of a series of papers by Alfred Boyles in which he sets forth the results of his further studies on iron-carbon-silicon alloys. This paper is entitled "Influence of Atmosphere and Pressure on Structure of Iron-Carbon-Silicon Alloys." Other papers of possible interest are "Dendritic Structure of Some Alloy Steels," by D. J. and J. L. Martin; "Kinetics of the Decomposition of Austenite at Constant Temperatures," by J. B. Austin and R. L. Rickett; "Reaction Kenetics in Processes of Neucleation and Growth," by W. A. Johnson and R. F. Mehl; "Phase Changes in 3.5 Per Cent Nickel Steel in the Ac_1 Region," by I. N. Zavarine; and "Fracture of Steels at Elevated Temperatures After Prolonged Loading," by R. H. Thielemann and E. R. Parker.

Handbook of Chemistry and Physics, 23rd Edition, 7¼x4¾, imitation leather bound, 2,239 pp., published by the Chemical Rubber Co., 1900 W. 112th St., Cleveland, Ohio. Price $6.00.

As a handbook on chemistry and physics, we believe that this volume needs no introduction. First published in 1913, containing 116 pp., the book has grown to the encyclopedic proportions given above. During the past four years over 86,000 copies are said to have been sold.

This new edition has been considerably increased over the former 22nd edition by some 400 pages of new and revised data. In general, the new edition is divided into five sections as follows: Section I—Mathematical Tables; Section II—Properties and Physical Constants; Section III—General Chemical Tables, Specific Gravity, Properties of Matter; Section IV—Heat, Hygrometry, Sound, Electricity, Magnetism, Light; Section V—Quantities and Units, Conversion Tables, Miscellaneous Tables. From this general summary alone, some idea of the wide scope of this volume may be obtained.

Section I covers the fundamental formulae used in differential and integral calculus, trigonometry, algebra, analytic geometry, mensuration, logarithms, exponentials, and contains many tables of constants, factorals, reciprocals, cubes, squares and roots, plus a large number of other interesting mathematical information.

Section II, devoted to properties and physical constants, gives large volumes of data on the chemical elements, organic and inorganic compounds, oils, fats and waxes, resins, minerals, alloys, plastics, woods, trade names and directions for pronunciation of chemical names.

Section III discusses and gives data on various methods of chemical analyses and tests, solubility, indicators, oxidation, ionization, dissociation, reduction values, heats of formation, solution and combustion, and other chemical phenomena.

Section IV gives data on thermal expansion, specific heats, mechanical equivalents of heat, melting and boiling points, freezing mixtures, vapor pressures, molecular constants, thermal conductivities, barometer corrections, humidity tables, etc. Under sound, velocity of sound, musical scales and sound absorption are discussed. Under electricity and magnetism, data on electromotive force, potentials, resistivity, x-ray data, ionization constants, calibration tables for thermocouples, etc., are given in tables. Spectroscopy, index of refraction, optical constants of metals, reflecting power, light transmission by various substances, colorimetry, optical rotation, etc., are discussed and data given under light.

Section V consists of discussions and tables of data on quantities, units, laws and formulae relating to physics and chemistry, measures and units, units and conversion tables, definitions of chemical terms, tables of moments of inertia, capacity, inductance, resistance, and much miscellaneous data.

The reviewer realizes that it is impossible in such limited space to outline even briefly the large volume of interesting and worthwhile information given in this handbook. The fact that its publication created sufficient interest to require its reissuance over a long period of years and its continual revision by a staff of collaborators whose knowledge is unquestioned, all do more to recommend this handbook to those interested in chemistry, physics, metallurgy, and in general scientific information, than anything he can say.

ABSTRACTS

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, N. Y.

Cast Iron

AUSTENITE TRANSFORMATION. *"Dilatometeric Studies in the Transformation of Austenite in a Molybdenum Cast Iron,"* by D. B. Oakley and J. F. Oesterle, *A.S.M. Preprint,* no. 11, 1940, pp. 1-16. The results of an investigation of the transformation of austenite as found in a 0.50 per cent molybdenum cast iron, and on the base iron from which the alloy was made, at seven constant subcritical temperatures are presented. In these studies a modified dilatometer was used. Total reaction times were observed and metallographic pictures of completed reactions shown. (C.I.)

HIGH TEST. *"Mechanical and Physical Properties of High Duty and Alloy Cast Irons,"* by J. W. Donaldson, *Foundry Trade Journal,* vol. 63, no. 1254, August 29, 1940, pp. 141-144. The development of high duty and alloy cast irons and their use for many stressed and other engineering parts necessitate a thorough knowledge of all their properties. The properties for such irons have been determined with the result that numerous investigations have been undertaken and a large amount of data has accumulated not only for such properties as tensile, transverse, and compressive strengths, but also for elasticity, hardness, fatigue, impact and shear strengths. Other determinations have been made for thermal and electrical properties yielding data on thermal conductivity, specific heat, etc. A knowledge of the data thus determined shows modern cast iron to be a reliable material for many engineering purposes and also indicates possibilities for its further development in the future. (C.I.)

HYDROGEN. *"The Significance of Hydrogen in the Metallurgy of Malleable Cast Iron,* by H. A. Schwartz, G. M. Guiler and M. K. Barnett, *A.S.M. preprint,* no. 3, 1940, pp. 1-21. This paper is in the form of an exploratory survey showing the significance of hydrogen content of white iron intended for conversion into malleable cast iron. This preprint contains data on the range of hydrogen contents to be expected in commercial melting and on its relation to oxygen content. Comment is made on the solubility of hydrogen in graphitized white cast iron and it is shown that in the annealing operation hydrogen is largely eliminated. It is shown that white iron anneals relatively slowly in hydrogen-rich atmospheres and that white cast irons rich in hydrogen initially anneal more slowly than those low in that element. Malleable cast iron made from metal initially high in hydrogen content is shown to be inferior in tensile properties to metal lower in that element even though the final hydrogen content is quite similar. (C.I.)

Coal-Pulverized

DEVELOPMENT. *"Milwaukee's Contribution to Pulverized-Coal Development,"* by H. Kreisinger and J. Blizard, *Mechanical Engineering,* vol. 62, no. 10, October, 1940, pp. 723-726, 737. This paper reviews briefly the many investigations of fundamental principles involved in the use of pulverized coal. Particular attention is paid to the findings of John Anderson who did pioneering work in this field. In determining the best method of burning powdered fuel Anderson did two things, (1) made a large scale trial installation of pulverized coal and (2) he provided the means for testing this fuel system and of analyzing the results which could be obtained with pulverized coal. A detailed study of experiments carried on in 1919 at the Oneida Street Station of the Milwaukee Electric Railway & Light Co. is given. (Fu.)

Corrosion

FERROUS METALS. *"Accelerated Spray Test for Determining the Relative Atmospheric Corrodibility of Ferrous Materials,"* by T. Swinden and W. W. Stevenson, *Foundry Trade Journal,* vol. 63, no. 1256, September 12, 1940, pp. 173-174, 178. From the author's standpoint, the accelerated spray test is of sufficient promise to be regarded as the basis of a laboratory method for the determination of the relative corrodibility of irons and constructional steels. To obtain the best results by this method certain experimental conditions should be adhered to; visible acid attack should not occur; the spray should consist of very fine droplets, each droplet being surrounded by air; and the stainless-steel control specimen should not be completely wetted. (M.)

Cupola

OPERATION. *"The Melting Process in the Foundry," Canada's Foundry Journal,* vol. 13, no. 8, September, 1940, pp. 24-25. In keeping within the melting process this section of the article deals with the first metal charge. It tends to disprove the old theory of making the first charge heavier, if not actually double the others, is entirely incorrect. Why such a custom is considered the wrong thing to do is then discussed. In conjunction with the importance of the first charge, such items as height of coke bed, weight of charges and uniformity of composition are taken into consideration. (F.)

Electric Furnace

PIG IRON. *"Production of Pig Iron in the Electric Furnace,"* by Charles Hart, *Metal Technology,* vol. 7, no. 6, September, 1940, pp. 1-12. The normal production of pig iron is carried on in blast furnaces in which charcoal, coke and anthracite are used as the fuel. This new electric process called for sufficient carbonaceous material to reduce the oxides and impregnate the pig iron with sufficient carbon, but the remainder of the energy was to be supplied by electric power. The chemical reactions are essentially the same in electric smelting as obtained in the older blast furnace. The data in this article relates to types of furnaces, their efficiencies, and commercial successes or failures in comparison with the electric smelting furnace used here in this country. (F.)

Fatigue

SURFACE CONDITIONS. *"Effect of Surface Conditions on Fatigue Properties,"* by O. J. Horger and H. R. Neifert, *A.S.M. Preprint,* no. 52, 1940, pp. 1-19. The influence of various kinds of surface conditions on the fatigue strength are presented from tests of rotating beams of various diameter specimens. Effect of surface finish as produced by machining operations were studied for rough turned, smooth turned, polished and super finished surfaces. Fatigue strength due to surface finish effects is compared with that obtained from surface treatment by rolling or burnishing, metal spraying, and flame hardening. (Te.)

Malleable Iron

SHORT CYCLE ANNEALING. *"Short Cycle Annealing,"* by R. M. Cherry, *The Iron Age,* vol. 146, no. 13, September 26, 1940, pp. 34-37. Short cycle annealing has been applied to every annealing cycle that reduces the total annealing time normally required in an old style fuel-fired periodic furnace. The saving may be due to the result of a change in the analysis of the iron, new furnace equipment, change in method of loading or a change in operating temperature. This particular article deals with the electric furnace and discusses the roller-hearth furnace, the pusher tray furnace and the batch type furnaces. Specific construction and operating data on the continuous type furnaces is given. Detailed information is also given on the batch type furnaces. The article is concluded with a number of advantages why the modern type electric furnace for annealing malleable iron castings results in the saving of money and time and improvement of quality. (M.)

Safety

SULPHUR DIOXIDE. *"Sulphur Dioxide in the Foundry,"* by F. A. Allen, *The Metal Industry* (London), vol. 47, no. 9, August 30, 1940, p. 172. Sulphur dioxide is inevitably present in varying concentrations in foundries producing magnesium alloy castings. To keep foundry workers from coming in contact with sulphur dioxide in various concentrations certain precautions have to be established. The foundries should be tested for atmospheric fumes to see that the sulphur dioxide content is within the safe limit. It is pointed out that average results may be misleading, so tests should be made at points adjacent to the workers at approximately head level. (Se.)

Steel

CORROSION. *"Influence of Cyclic Stress on Corrosion Pitting of Steels in Fresh Water, and Influence of Stress Corrosion on Fatigue Limits,"* by D. J. McAdam, Jr., and Glenn W. Geil, National Bureau of Standards, *Research Paper RP1307,* pp. 685-722. Through the examination of surfaces and longitudinal sections of specimens of steel after stress corrosion, information has been obtained about the influence of cyclic stress (during corrosion) on the form and size of corrosion pits. Information is given on the theoretical stress concentration due to corrosion pits, and of the influence of size on the effective stress concentration. Through the comparison of typical views of corrosion

pits with curves representing the decrease of the fatigue limit with corrosion time, the forms and sizes of corrosion pits are correlated with the resultant lowering of the fatigue limit. The stress corrosion process is discussed in terms of the general theory of corrosion of metals. With increase in cyclic stress and cycle frequency, the corrosion process is shifted from a cathodically controlled process toward an anodically controlled process. (S.)

SPECTROSCOPIC EXAMINATION. *"The Spectroscopic Analysis of Steels,"* by A. Fisher, *Foundry Trade Journal,* vol. 63, no. 1252, August 15, 1940, p. 112. Spectroscopic methods of analysis of metals, as distinct from spectrographic methods, are used where the most rapid results are required. This report gives the mode of operation of spectroscopic analysis of steels, what the appearance of the spectrum looks like, how determinations are made, the essential requirements of the apparatus and a description of the apparatus itself. (S.)

STRAIN HARDNESS. *"Quantitative Measurement of Strain Hardness in Austenite Manganese Steel,"* by D. Niconoff, *A.S.M. Preprint,* no. 15, 1940, pp. 1-20. Strain hardening properties of austenitic manganese steel were determined by subjecting it to impacts of different intensities and measuring the surface hardness as well as the depth of penetration. The maximum strain, approximately Rockwell C-50, was found to be located not at the surface, but a short distance below it. Strain hardening gradually decreased farther down. (S.)

Steel Castings

CRANKSHAFTS. *"Ford Cast Steel Crankshafts Now Poured Continuously,"* by E. F. Cone, *Metals and Alloys,* vol. 12, no. 3, September, 1940, pp. 267-270. Since the Ford Motor Co. initiated the production of a crankshaft of cast steel, it has been the aim of the company to develop the process from an intermittent to a continuous melting operation. There were numerous steps involved in developing this process and many attempts were made before the right type of furnace for such melting was found. A furnace was finally built that would combine the stack charging and continuity of a regular cupola with the hearth and chamber similar to a pulverized coal-fired air furnace. The new process is discussed and includes the materials that make up each charge. The details of specially built cupolas are discussed along with the present composition of the metal. (S.)

Steel Melting

ELECTRIC. *"The Electric Furnace in the Steel Foundry,"* by F. A. Melmoth, *Foundry Trade Journal,* vol. 63, no. 1252, August 15, 1940, pp. 106, 108. This is a general discussion of the electric furnace concerning its metallurgical features, a comparison of physical properties received in a basic and acid furnace and some of the economical aspects of the furnace. The author concludes his article by giving a few advantages for the use of this furnace in industry. (F. and also S.)

SLAG CONTROL. *"Slag Control in Steel Furnaces,"* by Dr. C. H. Herty, *Foundry Trade Journal,* vol. 63, no. 1250, August 1, 1940, pp. 77-78. The present era of close specification, the drive for uniformity of product, and the close inspection of the product and of the cost sheet, the utmost efforts must be made to control the steelmaking variables to the best advantage of the steel producer. One of the major variables is the slag in the furnace and its effect upon the composition and quality of the metal. In recent years the iron-oxide content of the metal bath and the reactions of deoxidation have been studied intensively. Available knowledge of the variables affecting the sulphur, phosphorus and oxygen contents of the metal is summarized. The ultimate objects of slag control are also listed. The author then discusses open hearth slags, effect of silicon in charge, corrections on charging and estimation of slag composition. (S.)

SLAG CONTROL. *"Slag Control in Steel Furnaces"* by John Herty, *Foundry Trade Journal,* vol. 63, no. 1251, August 8, 1940, pp. 89, 94. The color of slag when cooled in water is a guide to its approximate composition; and the manner in which the slag flows off a stirring rod after withdrawal from the furnace is used as the melter's guide in the study of slag viscosity. The general principle of utilizing such information obtained during the melting of the heat is simple. For any given grade a certain type of finishing slag is desired. To combat certain conditions that arise during working the author tells how these conditions can be corrected by the following of some simple rules. To illustrate modifications and applications of the procedures described, three examples have been chosen of control methods for sulphur, phosphorus and iron oxide in the slag. (S.)

Surface Designations

FINISHES. *"How Should Engineers Describe a Surface?,"* by O. R. Schurig, *Mechanical Engineering,* vol. 62, no. 10, October, 1940, pp. 703-711. This paper shows some of the types of surfaces in which the General Electric Co. are interested in, some of their characteristics and the requirements they have to meet. Questions for the purpose of establishing what surface characteristics need to be considered as a basis for describing and specifying surface deviations in industry are submitted. This paper is limited to consideration of three kinds of surface deviations or irregularities, namely, waviness, roughness, and flaws. The review of surfaces of various manufactured parts includes: (1) bearing surfaces operated with oil; (2) dry rubbing surfaces, and (3) stationary contact surfaces and joints. (T.)

Book Review

Metallurgy, by C. G. Johnson, R. S. Dean and J. L. Gregg, 5½x8½, cloth cover, 149 pp., 82 illustrations, published by American Technical Society, Chicago. Price $1.50.

This book appears to be a good one for the student and beginner in metallurgy. It seems to cover the salient points that the beginner should know, but because of the limited scope of the book, does not go into detail in many of the processes. This is a decided advantage to the beginner as he does not become confused. The book covers some of the fundamentals of testing, chemical and physical metallurgy, the iron-carbon diagram, shaping and forming of metals, steel specifications, carbon and alloy steels, powder metallurgy, and finally gives a list of publications which are recommended to those desiring more and specific information.

Statement of Ownership

Statement of the ownership, management, circulation, etc., required by the acts of Congress of August 24, 1912, and March 3, 1933, of American Foundryman, American Foundrymen's Association, published monthly at Chicago, Ill., for December 1, 1940. State of Illinois, County of Cook, ss. Before me, a notary public in and for the State and county aforesaid, personally appeared R. E. Kennedy, who, having been duly sworn according to law, deposes and says that he is the Editor of the American Foundryman, American Foundrymen's Association, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to-wit: 1—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Foundrymen's Association, Inc., Chicago, Ill.; Editor, R. E. Kennedy, Chicago, Ill.; Managing Editor, N. F. Hindle, Chicago, Ill.; Business Managers, None. 2—That the owner is American Foundrymen's Association, Inc., not for profit; stock, none. Principal Officers, L. N. Shannon, President, c/o Stockham Pipe Fittings Co., Birmingham, Ala.; C. E. Hoyt, Executive Vice President, Chicago, Ill.; R. E. Kennedy, Secretary, Chicago, Ill. 3—That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. 4—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. R. E. Kennedy, editor. Sworn to and subscribed before me this 28th day of Sept. 1940. (Seal) Jennie Reininga, Notary Public. (My commission expires Feb. 9, 1942.)

An Outline of Metallurgical Practice, by Carle R. Hayward, Professor of Process Metallurgy, Massachusetts Institute of Technology, Second Edition, cloth bound, 690 pages, 421 illustrations, 69 tables. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. Price $7.50.

The preface of this book explains that it is not intended to replace any work which has appeared on metallurgical practice in general nor any devoted to specialized fields of this general field. It is designed to meet two conditions: (1) the desire of many engineers for a quick reference book on modern practices in extracting and refining most metals and to give general information on the sources, uses and important alloys of the metals; (2) to assist students in the metallurgical field who have little or no knowledge of the subject or its literature. Each chapter deals with a different metal.

The introduction generalizes on mining and methods of separation of the metals from their ores. Following the introduction are chapters on copper, lead, zinc, aluminum, nickel, tin, mercury, antomony, arsenic, bismuth, cadmium, cobalt, magnesium, beryllium, gold, silver, platinum, chromium, tungsten, manganese, vanadium, molybdenium and zirconium. The final chapters of the book deal with iron and steel manufacture in a very general manner, including the various type melting units and processing methods. A small section indeed is devoted to casting processes and methods. The final chapter is devoted to non-ferrous alloys.

November Chapter Meeting Schedule

November 1

Western New York
Hotel Touraine, Buffalo
O. W. Ellis, Ontario Research Foundation, Toronto
"Non-Ferrous Castings"

✦ ✦

November 4

Central Indiana
Washington Hotel, Indianapolis
E. C. Zirzow, National Mall. & Steel Casting Co., Cleveland
"Sand Control"

✦

Michiana
LaSalle Hotel, South Bend
Sectional Meeting
A. W. Gregg, Whiting Corp., Harvey
"Electric Furnace Melting Practice"
B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis
"Coke for Cupola Operation"
A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee
"Non-Ferrous Gating"

✦ ✦

November 6

Metropolitan
Essex House, Newark, N. J.
C. A. Barnett, Foundry Equipment Co., Cleveland
"Recent Developments in Core Baking and Mold Drying Practices"

✦ ✦

November 8

Central New York
Hotel Onondaga, Syracuse
Harry W. Dietert, H. W. Dietert Co., Detroit
"Sand"

✦

Northern California
Lake Merritt Hotel, Oakland
Sectional Meeting
B. C. Page, F. K. Simonds Co., Berkeley
"Production of Uniform Dense Structures in High Test and Alloy Iron Castings" by M. A. Scott
J. R. Scott, Kingwell Bros., San Francisco
"Analysis of Non-Ferrous Foundry Defects"
Earl McDonald, Monarch Foundry, Stockton
"Application of Controlled Directional Solidification of Large Steel Castings" by J. A. Duma and S. W. Brinson

Philadelphia
Engineers Club
Col. W. W. Rose, Gray Iron Founders' Society, Cleveland
'The Disposal of the Products of the Gray Iron Foundry"

✦ ✦

November 11

Chicago
Chicago Towers Club
Round Table Discussion
"Gating and Risering"
E. J. Carmody, C. C. Kawin Co., Chicago—Gray Iron and Malleable
H. A. Forsberg, Continental Roll & Steel Foundry Co., Chicago—Steel
A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee—Non-Ferrous

✦ ✦

November 12

Cincinnati District
Alms Hotel, Cincinnati
J. S. Vanick, International Nickel Co., New York City
"Engineering Properties of Cast Iron"
Motion Pictures—*"Nickel High-Lights"*

✦

Northern Illinois-Southern Wisconsin
Hotel Freeport, Freeport, Ill.
A. W. Gregg, Whiting Corp., Harvey
"Cupola Operation"

✦ ✦

November 14

Detroit
Leland Hotel
J. A. Gitzen, Delta Oil Products Co., Milwaukee
"Chemical and Physical Characteristics of Core Binders and Core Washes"

✦

Northeastern Ohio
Cleveland Club, Cleveland
H. W. Dietert, Harry W. Dietert Co., Detroit
"What Is Good Molding Sand?"

✦

St. Louis District
DeSoto Hotel, St. Louis
G. S. Evans, Mathieson Alkali Works, New York City
"Cupola Research"

✦ ✦

November 15

Wisconsin
Hotel Schroeder, Milwaukee
Sectional Meeting
G. S. Evans, Mathieson Alkali Works, New York City (Gray Iron)
"Cupola Research"
W. H. Parker, American Steel Foundries, E. Chicago, Ind. (Steel)
"Casting Defects and Their Remedy"
R. J. Anderson, Belle City Mall. Iron Co., Racine, Wis. (Malleable)
"Cleaning Methods"
William Eck, Wisconsin Aluminum Foundry, Manitowoc, Wis. (Non-Ferrous) *"Aluminum Castings"*

✦

Birmingham District Chapter
Tutwiler Hotel
S. C. Massari, Association of Manufacturers of Chilled Car Wheels, Chicago, Ill.
"Automatic Cupola Control by Means of Controlled Combustion and the Effect of Melting on the Ultimate Behavior of the Iron."

✦ ✦

November 18

Quad City
LeClaire Hotel, Moline, Ill.
G. S. Evans, Mathieson Alkali Works, New York City
"Cupola Research"

✦ ✦

November 21

Southern California
Clark Hotel

✦ ✦

November 29

Ontario
Rock Garden Lodge, Near Hamilton
Sectional Meeting
T. A. Rice, International Harvester Co. of Canada, Ltd.—Malleable
O. W. Ellis, Ontario Research Foundation, and J. C. Stavert, Babcock-Wilcox and Goldie-McCulloch, Ltd.—Gray Iron
Joseph Sully, Sully Brass Foundry, Ltd.—Non-Ferrous

✦ ✦

Chapter Organization

November 15

Baltimore-Washington District
Lord Baltimore Hotel, Baltimore, Md.

✦ ✦

Regional Meeting

Februray 20 and 21

Wisconsin Chapter
Fourth Annual Regional Conference
Hotel Schroeder, Milwaukee

If you are an A.F.A. member you hold the most important key in the world. A key that fits into the keyhole of every day foundry practice and with one little twist can bring more good things to you than the jinni in Aladdin's lamp.

Just What Can It Do For You?

Why, man, you can unlock the vaults and archives of A. F. A. and gather the most valuable foundry knowledge that has been accumulated from the four corners of the world. The doors will roll back and reveal volume after volume, book after book, pamphlet after pamphlet, booklet after booklet and preprint after preprint—many that would help **you** in your quest for modern up-to-date foundry material.

Here are a few examples:

Chaplets and the Steel Casting, by H. F. Taylor and E. A. Rominski. Price $0.50 to members and $1.00 to non-members.

Published by permission of the Navy Department, this present study is an initial step in the interests of bringing to light some of the many factors operative in governing the fusion characteristics of the various types of chaplets available. (Publication No. 40-25.)

Composite Molding in a Malleable Foundry, by S. W. Healy. Price $0.20 to members and $0.40 to non-members.

This is a study of the advancement that has been made by the automotive production foundries from the loose patterns and hand-rammed gates of patterns to match plates and cope and drag machine equipment. (Publication No. 40-2.)

Melting of Copper-Base Alloys to Retain Physical Properties, by W. B. George. Price $0.20 to members and $0.40 to non-members.

Being impossible to lay down a universal cure-all for the various difficulties encountered in meeting specifications it is the purpose of this paper to outline the practice that is being used most extensively to obtain satisfactory results. (Publication No. 40-6.)

Job Evaluation and Time Study in the Foundry. Price $0.50 to members and $1.00 to non-members.

This brand new publication is the second in the series on this subject. The first issue, in 1937, was exhausted and a new paper was printed. This booklet contains a panel discussion which occurred at the Job Evaluation and Time Study session during the 1940 convention. Five prominent men in the job evaluation and time study field express their views on problems encountered in industry. (Publication No. 40-30.)

AMERICAN FOUNDRYMEN'S ASSOCIATION
222 WEST ADAMS STREET, CHICAGO

Please forward the following publications:

Publication No..... Number of copies.....

Publication No..... Number of copies.....

Publication No..... Number of copies.....

Publication No..... Number of copies.....

Enclosed is check or money for $.....

Name .....

Firm .....

Street .....

City and State.....